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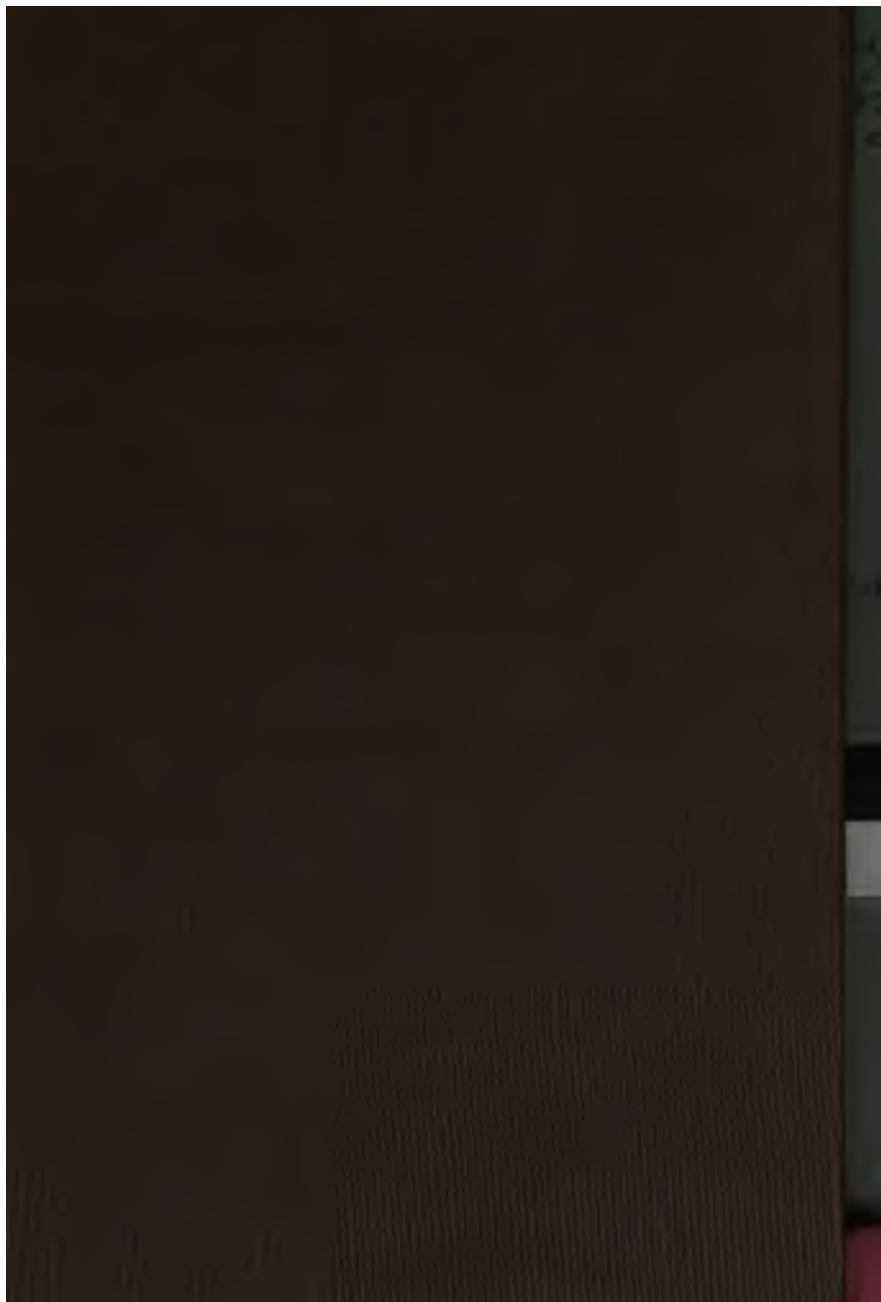
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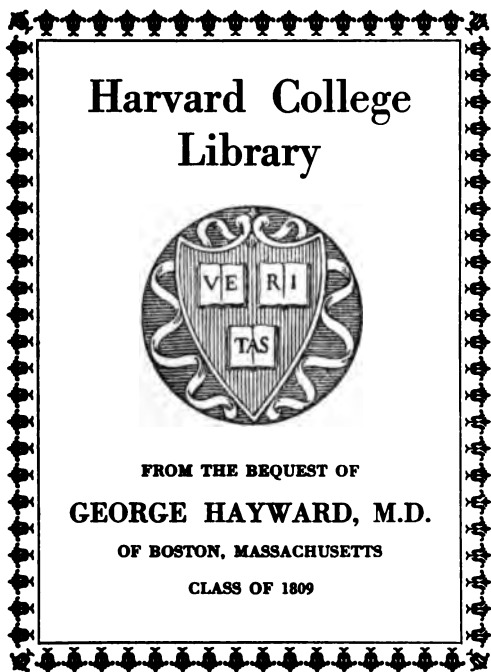
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A HANDBOOK

TO THE INDUSTRIES OF

THE BRITISH ISLES

AND

THE UNITED STATES.

BY

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PREFACE.

A STRONG feeling has been growing up of late as to the advisability of cultivating some acquaintance with the industrial condition of the countries of the world, a knowledge of which is clearly of very great importance in these days of technical activity. The object of this little work is to explain in the simplest language the resources and industries of each country, together with the physical and geographical causes that have led to their existence.

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THE BRITISH ISLES.

THE BRITISH ISLES.

COAL AND IRON.

GREAT BRITAIN, though she is one of the smallest states or kingdoms of all Europe, is nevertheless the richest and most powerful ; and this is mainly owing to her geographical position, and to the great number and variety of industries which are carried on within so small a space. Nature has been very bountiful to England, for externally she is surrounded on all sides by seas, which not only protect her from invasion by foreign armies, but afford her every facility for the shipping that carries her commerce to all parts of the world : while within, she possesses noble rivers to fertilize her lands, and give water-power for her trades and manufactures. Her mountains and hills are full of valuable rocks and building stones ; while underneath her soil are the greatest treasures of all, beds of coal and iron, not to speak of tin, copper, and lead, in almost inexhaustible quantities. No country, except America, can at all approach England in the vastness of these underground riches, and it is owing to them that her people have become the greatest manufacturing people in the

world; for no country can be truly great, unless it contain coal and iron, which are in reality more valuable than gold, silver, or precious stones.

The coal-fields or basins of Great Britain are eighteen in number. The longest worked and most important, is

1. That of Northumberland, situated in that county, as well as in Durham. The coals are of three kinds, house coal, steam coals for engines and manufacturing purposes, and gas coal; and they are shipped at Newcastle-on-Tyne, Sunderland on the Wear, Blyth and Seaham on the coast, and Hartlepool on the northern shore of the estuary of the Tees.

2. The Yorkshire basin is also very large, and extends not only over a great portion of the West Riding and South Yorkshire, but also into Derbyshire, Leicestershire and Nottinghamshire. These coals are much used in the busy Yorkshire manufacturing districts, and are sent up in great quantities by rail to London.

3. The South Wales basin is very extensive, spreading over the counties of Monmouth, Glamorgan, Brecon, Caermarthen and Pembroke. Besides steam coal, for which South Wales is famous, there are also stone coals or anthracite, which are the only coals used for malting and brewing. These are sent by rail to Burton-on-Trent; but the shipping ports for the other coals are Newport, Cardiff and Swansea.

4. The Staffordshire coal-field, which occupies extensive portions of the counties of Stafford and Worcester, is not so large as these others; but contains very rich and valuable beds of coal, which are

principally used in the busy iron districts of Birmingham and Wolverhampton. Not far to the north of it, but quite separate, is

5. The North Staffordshire field, which supplies the wants of the Potteries.

6. The Lancashire basin occupies about the southern half of this county, and contains some very valuable seams of house coal, of which the cannel coal, found at Wigan, is particularly famous. The produce of this basin is shipped at Liverpool, Garston, and Runcorn in Cheshire.

7. The Cumberland basin extends over a great part of that county. Much of the coal is made into coke for the Cleveland and Durham ironworks, and a considerable quantity is shipped to Ireland, the shipping ports being Workington, Maryport, and Whitehaven.

8. The North Wales basin is not a very large one, and extends along the estuary of the Dee, in the counties of Denbigh and Flint, and, very slightly, into Cheshire. These coals supply the North Welsh ironworks, and are also sent to London by rail.

9. The Somersetshire coal-field stretches from Bristol nearly to Wells, and is the most southerly field in England. It is not very important.

10. The Coalbrookdale basin is a small, but very busy field in Shropshire, running along-side the Severn river, and supplying many ironworks in that district.

11. The Forest of Dean coal-basin is also small but valuable, and is situated in Gloucestershire, in the angle formed by the estuary of the Severn and the Wye. The shipping ports are Lydney and Bullo.

12. The Warwickshire field, lying to the north of

Coventry, possesses the advantage of being the nearest to London.

13. The Shropshire field lies to the south of Shrewsbury, and is small and unimportant. Turning northwards to Scotland, we find some very extensive coal-fields, supplying a vast manufacturing population.

14. The Lanarkshire basin is the largest and richest in Scotland, occupying a considerable part of that county, and extending into those of Renfrew, Dumbarton and Stirling.

15. The Ayrshire field is important, and is found in Ayrshire and Dumfriesshire. The coals are used in the numerous ironworks, and a good deal is shipped at Troon for Ireland.

16. The Fifeshire basin occupies a good part of the counties of Fife and Clackmannan, and supplies the busy spinning and weaving districts of the linen trade.

17. The Midlothian field is situated in the counties of Edinburgh and Haddington, and is only of local importance. Ireland is but poorly supplied with coal, and has to get most of what she wants from England and Scotland. Her chief basins are

18. That of Ulster, which is in Antrim on the borders of Lough Neagh, and also at Ballycastle.

19. That of Leinster, which is principally anthracite or stone coal, situated in Kilkenny and Carlow Counties. British coal-basins taken together produce the enormous quantity of about 150,000,000 tons of coal every year, and the number of colliers and miners, who are employed in the coalpits underground, and above ground, are at least half-a-million.

But there are other valuable things under-ground besides coal, and the principal of these in England is iron ore, which lies in beds and veins in different parts of the kingdom, and is very largely mined to supply our iron and steel works. Iron ores vary much in appearance and value, some being very rich in iron and others very poor. As a rule, wherever coal is worked, there is nearly always iron ore to be found in the same neighbourhood ; but on the other hand great quantities of ore are also found where there is no coal. Those iron ores which are most abundant in this country, are called clay-band or coal-measure ores, and these are extracted from most of our great coal-basins, and particularly those of Scotland, South Wales, South and North Staffordshire ; they are very good ores for making iron with, but are not very rich. The second variety of iron ore is very rich indeed, and is found in the limestone rocks of North Lancashire and Cumberland. Barrow-in-Furness and Ulverstone are the ports where these red hematite ores are shipped in Lancashire, and Whitehaven in Cumberland. They are of great value for making iron, and fetch a much higher price than the coal-measure iron ores. The third class of iron ore is found in the Yorkshire hills which skirt the estuary of the Tees, and which consist almost entirely of iron stone. The ore is not very rich in iron, but it is extremely plentiful all through this district of Cleveland, and, although it has not been discovered very many years, it has had a wonderful effect in changing a desolate and barren country into one crowded with iron works, and very thickly populated. The fourth deposit of iron ore is

in character something like that of Cleveland, and is found in Northamptonshire, Bedfordshire, and Lincolnshire. It is called brown hematite, and is poor in iron ; but it is so abundant that it is worked in large quantities, and sent into Staffordshire and South Wales to be smelted, though a good deal is also smelted in the counties where it is raised. These then are the principal kinds and situations of iron ore in Great Britain, although in smaller quantities it is found also in the county of Cornwall, in the Mendip Hills in Somersetshire, in the Forest of Dean in Gloucestershire, and on the sea-coast of the county of Antrim in Ireland. Nearly 16,000,000 tons are every year raised of iron ore ; but large as this quantity is, it is not nearly enough to meet the wants of our great iron trade, for which very abundant supplies have to be brought from other parts of Europe, such as Spain, Italy, and from the French colony of Algeria. Generally speaking, the iron manufacture is to be found very near where the ore is dug ; but this is not always the case, for we have just seen that Northamptonshire sends most of her iron ore into Wales and Staffordshire. Still, as a rule, where the coal and iron ore are found, there we find also the iron furnaces for smelting the ore, and the forges and mills to turn the iron into rails and manufactured iron. The oldest seats of the iron trade in Great Britain are South Staffordshire and Scotland, and to this day they keep up their importance, though other and younger districts quite equal them now in the extent of the trade. The South Staffordshire iron works are situated mostly in that county, but partly also in Worcestershire, and occupy

a rather large and very uninviting district called the Black Country, which extends from Birmingham to Wednesbury, Wolverhampton and Dudley, and which is full of collieries, iron works and different manufactories; and is lighted up day and night with the glare of furnaces. The North Staffordshire iron works are in the neighbourhood of Stoke-upon-Trent and Hanley, but are not nearly so extensive and important as the others. In Scotland, the greater number of works are in Lanarkshire, extending from Carluke to Hamilton and Glasgow, and occupying the whole of the northern part of the county, and employing a very large population. There are also one or two works in the county of Stirling which deserve mention, as the Carron works, the oldest in all Scotland, and perhaps in Great Britain. There is a third iron district in Ayrshire, of which Ardrossan, Kilmarnock and Cumnock are the principal towns, with many works in their neighbourhood. In the North of England there are a great number of large works in the counties of Northumberland and Durham, the chief places where they are gathered together being Newcastle and the banks of the Tyne, Sunderland and the banks of the Wear, Darlington, Stockton and West Hartlepool. These two latter are only divided by the Tees from a still busier district, that of Cleveland, which, since the discovery of the iron ore in the hills, has become the centre of an enormous iron trade, causing several populous towns to rise up. Middlesbrough, the capital of this district, had only one house in it about forty-five years ago, and now it contains a population of 70,000, all depending upon the iron trade and those trades which have risen

up in connection with it. A great quantity of Cleveland iron is sent to Scotland ; and it has this peculiar feature in it, that iron is made there cheaper than at any place in England, and it may be said, in the world. In Lancashire and Cumberland there are some large works near Whitehaven, Workington, Barrow and Carnforth, and by the side of the estuary of the Duddon River, attracted by the neighbourhood of the very rich red hematite ore found in Furness and near Egremont. Coming southwards, there is a considerable iron trade carried on in South Lancashire, in the neighbourhoods of Wigan, Bolton and Liverpool, and a still larger one in the West Riding of Yorkshire, where are some of the most famous iron works in the country at Lowmoor and Bowling, near Bradford. Leeds is also a great iron centre, and the valley of the Don, in which Sheffield is situated, may be considered the headquarters of the steel trade. Further eastward we have a recent, but increasing iron district in Lincolnshire, in the neighbourhood of Brigg, which has arisen since the discovery of iron ore there. Chesterfield in Derbyshire, and the Erewash Valley on the borders of that county and of Nottingham, are also busy districts, employing large populations. The largest iron district in extent is, however, that of South Wales, the whole of the northern border of the coal-basin being a long line of ironwork towns, which have sprung up within the last 100 years. The reason why South Wales became such an important iron-making country, was because the coal basin contained such large supplies of the clay-band ironstones mentioned before ; but these

are now nearly exhausted, and South Wales has to depend a good deal upon ores from other places. Coalbrookdale in Shropshire is one of the earliest seats of the English iron trade, and still keeps up its reputation. There are also a few iron furnaces in the Forest of Dean and Northamptonshire, also a little patch of ironmaking district at Westbury in Wiltshire. Altogether in England, Scotland and Wales there are 962 iron furnaces, though it is very seldom that all these are at work, as when trade is very bad, many of these furnaces have to be put out. At present only about half of them are in blast. A large ironwork embraces other things besides furnaces, it must be remembered, which produce only cast iron or pig iron; and therefore we find that there are in the country a vast number of forges and mills, where the cast iron is made into wrought iron, and rolled into rails for railways. South Wales and Middlesbrough are the chief districts for the rail trade, while others, such as South Staffordshire, are specially famous for the different qualities of iron for manufacturing purposes, such as sheet, bar, angle, plate, or rod iron. Another great branch of the iron trade is that of steel. Formerly Sheffield was about the only place in Great Britain where steel was made, and in those days Swedish iron was principally used to make it from; but owing to the discovery of new processes by Bessemer and Thomas, it was found that English iron could also be used, and the consequence was that the steel trade is quite changed in character, and is now to be found taking the place of iron in many of the iron districts. Railway plant and material are almost entirely made of

steel now, and this has obliged the ironmasters who formerly made only iron, to change all the arrangements of their works, so that they can roll steel rails and produce steel generally instead of so much iron. Sheffield, however, keeps up its name for certain kinds of steel work, such as the rolling of enormous ship plates for the protection of our navy, and also for cutlery, which is still principally made, after the old fashion, of Swedish iron brought to Sheffield, and there manufactured into steel. The principal steel works are found at Sheffield, at Eston near Middlesbrough, at Elswick near Newcastle, where Sir William Armstrong casts his wonderful steel guns, at Barrow-in-Furness, at Glasgow and in South Wales. At least a quarter of a million persons are employed in these great industries of smelting and manufacturing iron and steel, and the amount of money invested in the trade amounts to many millions of pounds sterling.

COPPER, BRASS, TIN, AND LEAD.

COAL and Iron, though certainly the most valuable, are not the only underground riches which Great Britain possesses, for there are also large quantities of other metals, such as copper, tin and lead. The two first of these are very limited as to the localities where they are found, though in those localities they are abundant enough. They are both obtained from the counties of Cornwall and Devon,

though copper, it is true, is found on a smaller scale in some parts of the kingdom. In Cornwall, the copper occurs, not in layers like coal and iron, but in lodes, which permeate the granite rocks, and which are most irregular and uncertain in their course, so much so that a copper mine, after yielding large supplies for many years, frequently becomes so unproductive as to be scarcely worth working. Moreover, the value of copper in the market is not nearly so great as it was, owing to the extensive discoveries of copper in other countries, such as at the Cape of Good Hope, in South Australia, and North America near Lake Superior, so much so that the copper yield of Great Britain, which in 1856 was valued at nearly one and a-half million pounds sterling, decreased in 1873 to not quite half-a-million. Nevertheless, great fortunes have been made out of some of the big mines, such as the Devon Great Consols, which in twenty-one years produced between two and three million pounds worth of copper ore. Another important copper mine exists in Anglesea, at the Parys Mountain, which is of clay slate, and contains vast quantities of copper pyrites, which is obtained partly by deep mining and partly by chemical processes. Copper is also found in the lake districts in Lancashire, in County Wicklow at the Ovoca Mines, at Knockmahon in County Waterford, and at Berehaven in County Cork. Nor must we forget Alderley Edge, a pretty hill in Cheshire, where a good deal of copper has been obtained by chemical processes from the New Red Sandstone, though it scarcely pays to carry on the work at the present time. Staffordshire used to be a very productive

county and the mines at Ecton were very rich, but they have long since been unopened. A little copper ore is found also in North Wales and Yorkshire; and altogether we have about 118 copper mines, yielding from 60,000 to 70,000 tons of ore annually. But a great deal more copper ore is smelted in England than this, and we import quite as much as we raise, from Cuba, Australia, South America, Chili and the Cape. It is a singular example of the localisation of a trade, that copper smelting, or the reduction of the ore into merchantable copper, is in no case carried on at the spot where the ore is mined. There are only two copper-smelting districts in Great Britain—viz., in Lancashire, in the neighbourhood of Widnes and St Helens, and, to a far larger extent, in Glamorganshire and Caermarthenshire, where the ports of Swansea, Neath, Aberavon and Llanelly are the great centres of the trade, to which copper from all parts of the world is sent to be smelted. The whole country around these places is shrouded with a white and peculiarly unpleasant copper smoke, which has had the effect of entirely destroying vegetation for miles around, though it does not appear to be particularly prejudicial to health.

Our tin mines are principally found in the same counties as copper—viz., Devon and Cornwall, where they have been worked from time immemorial. The tin ores occur in the same lodes, and are frequently dug from out of the same mine, as, for example, at Dolcoath, which used to be fabulously rich in copper, but of late years has been so in tin, while the copper ore has decreased and almost disappeared. Besides

the tin ore obtained from the mines (and in this respect it differs from copper, as being the only ore—viz., the binoxide, whereas copper is found in several ores), there are what are called stream works, in which the refuse washed down the rivers is treated, so as to extract the tin. Altogether, in the two counties there are 156 tin mines, and about 56 stream works, yielding from 14,000 to 15,000 tons of tin ore or block tin, which, when smelted, produce about 10,000 tons of white or metallic tin. Tin, like copper, is liable to great fluctuations of yield and price, and the tin trade of England has suffered much from foreign imports, the chief being from the Banca Mines in the Straits Settlements of the Dutch, and more recently from Queensland and New South Wales in Australia. Both tin and copper mines are often of great depth, and sometimes, as at Botallack, run a long way under the sea. They are differently arranged from the coal mines, and the miners suffer greatly from the long depths to which they have to descend, and from the high temperature. The tin smelting works are situated almost entirely in Cornwall.

The lead ores are scattered about the kingdom much more than the copper and tin ores, and are found in different geological strata—viz., the mountain limestone or carboniferous rocks, and the slaty Silurian rocks. In the former group are lead mines (the ore being found in lodes) in Northumberland and Yorkshire, at the heads of Teesdale, Swaledale and Wharfedale. Alston in Northumberland, and Pateley Bridge and Grassington in Yorkshire, are the centres

of these lead-mining districts. The Peak country in Derbyshire, between Chesterfield, Castleton and Sheffield, has been very productive, and possesses a number of mines; but the yield has fallen off greatly of late years, as is also the case in Denbighshire and Flintshire, where the mines are troubled with floods of water. Of the slaty rock ores, South Wales is the chief deposit, in the counties of Cardigan and Montgomery, where the neighbourhood of Aberystwith and Llanidloes are becoming very important lead-mining districts. The Isle of Man and Wicklow county in Ireland have some valuable mines in the granite, which are very rich in their silver ores, though the carboniferous lead ores are generally poor in this respect. There is a rather rich lead district in the Silurian hills of the Stiperstones, on the borders of Shropshire and Wales; and also at Wanlockhead and Leadhills in Lanarkshire, together with a small patch in the mountain limestone of the Mendip Hills, Somersetshire. The number of lead mines in Great Britain is 304, producing about 76,000 tons of ore. When it is smelted, the amount of actual lead obtained is about 57,000 tons, together with about 460,000 *ounces* of silver. But the production of lead has gradually been falling off, and we have to import a good deal, principally from Italy. Lead ore dressing is always carried on at the top of the mines, but the principal lead smelting works are at Alston, and near Newcastle in Northumberland, at Holywell and Flint in North Wales, and at Wanlockhead in Lanarkshire. These, then, are our principal under-ground riches, though we must not forget that we have mines of other kinds,

though they are comparatively insignificant. These are zinc, generally found with or near the lead in Northumberland and North Wales, although our chief supplies come from Belgium; manganese, found in Devonshire and Cornwall, though Spain sends us most of what we require; besides a small quantity of sulphur ore, arsenic, bismuth, and ochre; and a still more minute quantity of gold, found, though not to any profitable amount, in the quartz mountains of Caernarvonshire and Merionethshire.

Besides these, the main industries connected with the mining and smelting of our principal metals, there are some others which should be mentioned ere we pass to the subject of hardwares. Brass, the most important metallic substance after iron, is a combination of copper with either tin, zinc, or lead, according to the quality required; and brass founding and casting give employment to a large body of people (about 25,000) in all the varied branches of brass work. Birmingham and Bristol are perhaps the two towns which may be said to be the headquarters of the brass trade; but in point of fact, when we consider the many subsidiary occupations included under that term—such as plumbers' work, brass wire and sheathing for ships' bottoms, tubes, lamps, gasfittings, house furnishing, etc.—there is scarcely a place of any size where the brass trade is not represented in some shape or other. It may be mentioned that brass casting and founding is an unhealthy occupation, on account of the deleterious metallic fumes given off in the process, principally those of oxide of zinc.

The manufacture of tin plate is largely carried on in England, and employs a great number of people. Tin plate is really nothing more than thin sheets of iron coated with tin, and the principal seats of the trade are, therefore, naturally found near the iron-working centres. Monmouthshire and Glamorganshire in South Wales, and the neighbourhoods of Birmingham and Wolverhampton, contain the majority of the tinplate works, a large part of the production of which is sent to Liverpool, to be shipped to the United States, the best customers that we have.

HARDWARES AND FINISHED METAL TRADES.

THE hardware trades form a most important group of British industries, including a very comprehensive variety of occupations, giving employment to vast bodies of people, and impressing whole towns and districts with the peculiarities of that special branch for which they are celebrated. Under this head we shall discuss such articles as nails, locks, pins, needles, cutlery, steel pens, chains, buttons, screws, wire, cheap jewellery, electro-plate, the great majority of which result in the production of things very insignificant and small in themselves, but of enormous value when we come to think of the quantities produced and their use to mankind. For instance, what is the value of a nail, a pin, a button,

or a steel pen? They are scarcely worth the picking up from off the ground—and yet the amount of money that is spent in their production, and in their purchase afterwards, is almost incredible, and shows us the oft repeated fact, that there is no article, however trifling in itself, that has not its recognised value, and that does not fill its proper place in civilisation. Nails, though simple and rough looking things, are yet made in very few places in Great Britain, and the bulk of them are turned out in only two or three districts. They consist of the hand-made and the machine-made nails, the latter of which, though not always the better nail of the two, is fast displacing the hand-made, by reason of its greater cheapness and quicker rate of production. Machinery invariably has these effects. The hand-made nail trade is located almost entirely in the Black Country of South Staffordshire and Worcestershire, where the two counties—both abounding in coal and iron—run into one another. Dudley, Cradley, and Halesowen are the great nail making towns, and there is another colony of nailers at Bromsgrove, a little farther off in Worcestershire, and also at Belper in Derbyshire. The first named district, where the majority of nailers are employed, is a miserable one—dirty, wretched, and uncivilised, and the nailers themselves are perhaps one of the roughest and lowest classes of our population. Men, women and children (and especially the last two) work from morning to night at their anvils for very small earnings, and altogether their life is of the hardest and most cheerless. Machine-made nails are produced in factories in different places, such as Birmingham,

Wolverhampton, Leeds, Newcastle, and Newport in Monmouthshire, and the workers in these factories are under far better conditions than the hand-makers.

Another branch of this trade is the making of chains and anchors, which is mainly done by hand at Dudley and Cradley. The chain makers are but a little above the nailers in position, but the anchor makers take a much higher rank as skilled workmen.

Locks are more of a local trade than even nail-making, for they are produced within a very small compass in Walsall, Wolverhampton and Willenhall, all South Staffordshire manufacturing towns close to each other. What is more curious still, each one of these places is noted for a particular kind of lock, the Wolverhampton makers producing kinds quite different to those of Walsall or Brewood. Over 7000 people are employed in the trade, which is carried on mostly at home by men who have risen from workmen to be masters in a small way. One feature in the lock trade is worth mentioning, and that is their excessive cheapness, the common sorts being made for 6½d. per dozen. Walsall, it should be stated, is also the principal centre of a very large trade in bits, spurs, bridles, and saddles, and the numerous ironmongeries that are connected with horse clothing.

Pins are made principally at Birmingham, though there are manufactories also at Bristol, Dublin, Warrington in Lancashire, and the little town of Stroud in Gloucestershire. Machinery has brought pin-making to such perfection, that comparatively few persons are now employed in the trade: for whereas it took fourteen sets of workers to produce a pin, now it

only requires two or three. This is not the case, however, with needles, which from their peculiar qualities and temper, are obliged to be made very much by hand, and have to pass through a great variety of processes. Redditch, a small town in Worcestershire, is the chief seat of the needle and fish hook manufacture, although a certain class of needles is made also at Hathersage, a small village amongst the hills of Derbyshire, and to a small extent at Sheffield. There seems to be no special reason why Redditch should have become so exclusively the centre of this trade, save that the German needle makers, who imported the knowledge of it into England, settled down here by chance; and so the industry flourished, until now Redditch needles and hooks are celebrated over the world.

Cutlery is a very busy and important branch of the hardware trades, employing between 40,000 and 50,000 people, of whom the majority belong to Sheffield, Wolverhampton and Birmingham. The two latter towns, however, are more occupied with edged-tool making, while Sheffield deals mostly with the finer kinds of tools—saws, files, forks, scissors, and surgical instruments. Sheffield knives are known throughout the whole globe, not only in civilised countries, but also in the savage wilds of Africa; but the English reputation for tools has been rather undermined of late years in foreign markets by Germans, and most of all, Americans, who are also great tool manufacturers, and particularly of those for agricultural purposes. Sheffield is situated very picturesquely, and rather peculiarly, on the hills overlooking the valley of the Don,

to which a number of little streams, such as the Sheaf and Rivelin, contribute; and this great abundance of water-power is the reason why we find, dotted up and down these narrow valleys, the wheels or "hulls" of the grinders of scissors, forks, or whatever it may be. They are a singular race of workers, who dislike the idea of any stranger coming into the neighbourhood to carry on the same trade as their own, and try all they can to keep the grinders' occupation descending from father to son. Grinding, and especially dry grinding, is almost the unhealthiest of all our industries, from the necessity of breathing the dust which flies off from the metal, and also from the millstone; but so great is the workers' dislike to any effort made to better their position, that many of them prefer to die young from the disease known as "grinders' rot," to using any simple appliances which would remedy the mischief. A large number of operatives are also employed in Sheffield at the hafting of table-knives and forks, and the ivory work necessary for this. It was once a great place for the manufacture of crinoline wire, but the change of fashion has almost entirely destroyed this trade.

Steel pens are principally, if not altogether, made in Birmingham, where large numbers of women and girls are employed in the factories. The number of steel pens turned out every year is prodigious, as may be guessed by the fact that each girl engaged in piercing for the nibs, has to do in one day's work 120 gross, or over 27,000 pens.

Screws, or what are called wood-screws, another great Birmingham trade, are turned out in vast quan-

tities by machinery. It is comparatively a recent manufacture, but is rising to great importance. The same may be said of nuts and bolts, which are used by the million in our great engineering works, in the building of locomotives, iron ships, bridges, girders and railways. They are produced entirely by most ingenious machinery, and the principal manufactories are to be found at Darlaston and Wolverhampton in Staffordshire, and near Newport in Monmouthshire.

Buttons, again, are almost entirely made in Birmingham, whatever may be the material, whether metal, linen-covered, pearl, vegetable ivory (or corozo nut), glass, bone or wood. There is no single article of attire which has undergone such curious changes from the caprice of fashion as our buttons: some shapes or materials which were in demand fifty years ago having entirely disappeared. The button trade, however, is a trade of considerable importance, and employs about 7000 persons.

The wire trade may be divided into two distinct branches—the making of the wire, and the working it up into various articles when made. The former of these is always found in the coal and iron districts, as it involves large establishments, and, in fact, almost comes under the head of iron works. The best known wire works in this country are at Wolverhampton, Manchester, Sheffield, Warrington, and near Newport in Monmouthshire, in all of which a vast quantity of iron is annually consumed. Wire-working or drawing is a very different trade, and may be found in almost every town of any size, as it requires but little machinery or capital.

Jewellery has many and very distinct branches of manufacture, for it embraces not only the expensive articles in gold and silver, but also the cheap and imitation jewellery which is made in such vast quantities in this country. Of the latter, Birmingham is again the great centre, whole districts of the town being occupied by the jewellers engaged in producing cheap gold and silver chains, locketts, earrings, and other decorations. There is no place in England, or indeed in the whole world, that can compete with Birmingham in the low price and yet general excellence of her cheap jewellery, though the Clerkenwell district in London is the seat of a great jewellery and goldsmith's trade, but of a more expensive class of goods than Birmingham produces. It must not, however, be understood that Birmingham turns out no high-class work in this department; for some of the electro-plate produced there, in establishments like those of Messrs Elkington, has a world-wide reputation for its extreme beauty and artistic value. A great deal of electro-plating, which may be said to hold a middle place between a mechanical and a chemical industry, is carried on also at Sheffield, where most of the articles known as Britannia metal are made. Clerkenwell is noted for its watchmaking, as well as for its gold and silver work, though we have not in Great Britain any of those great watchmaking districts that are to be found in France or Germany. Prescott, a little Lancashire town near Liverpool, and to a small extent, Christchurch, in Hampshire, are the only ones of the kind, and in the former upwards of forty distinct branches of the watch and clock making trade are carried on.

Though watches, and especially the cheap ones, are a good deal turned out on the American "interchangeable" system, by which every part is produced wholesale on exactly the same scale, thus making it very easy to replace any portion of the watch, we have as yet no large watch factories, such as exist at Waltham, in Massachusetts, where they are made in thousands by machinery.

Although it is difficult under what head to classify them, we ought not to omit guns and fire-arms generally, which form one of the most special trades of Birmingham, just as it does of Liège, in Belgium. A gun, in its manufacture, used to employ upwards of fifty different sets of hands, each of which was occupied in a particular item of the gun, and no other, such as the maker of the barrel, the lock, the sight, the stock, the trigger, etc.; but now-a-days this has been greatly reduced by the interchangeable system, as in the case of watches, and the fire-arm trade is undergoing many changes on this account. Nine-tenths of the gun and rifle manufacture is carried on at Birmingham, though there is a large Government gun factory at Enfield, near London. Gunpowder is made under very different conditions, far away from the bustle and noise of large towns. The production of gunpowder is attended with so much risk to life, that we always find powder works situated in some quiet, remote place on the banks of a stream, so that when an explosion does happen, it may do as little damage as possible. Our principal gunpowder works are near Hounslow and Waltham Abbey in Middlesex, near Dartford and Tunbridge in Kent, at Chilworth near Guildford in Surrey; and also at Elterwater, in the

Lake district; and there are manufactories of gun cotton at Stowmarket in Suffolk, and Faversham in Kent, which are almost as dangerous as those of gunpowder, if anything goes wrong.

Percussion-caps and cartridges form another considerable branch of the fire-arm trade, which, though sufficiently dangerous, is carried on under such strict regulations as to make the risk as small as possible. One of the largest percussion-cap factories is in London, in the Gray's-Inn Road, but the majority are in the outskirts of Birmingham and Wolverhampton, while caps for the use of our army are mainly produced at the Arsenal in Woolwich. Connected with this subject of warfare are those gigantic establishments, which are known throughout the globe for their monster productions in the shape of cannon and armour-plate. The largest guns ever made come from the Royal Arsenal at Woolwich; but an equal reputation attaches to Sir William Armstrong's vast works at Elswick near Newcastle, where the great guns that bear his name are produced. Sheffield is the head-quarters of the manufacture of armour-plate, which is rolled of enormous thickness, and is, unfortunately, a branch of trade which, like that of cannon, does not seem destined to die out for a considerable time.

If there is one branch of manufacture more than another that England excels in over all the world, it is that of machinery, whatever may be the kind. Agricultural machinery has of late years developed into a gigantic industry, employing between 20,000 and 30,000 hands and a vast amount of capital. There are few towns now of any importance which do not

possess some agricultural implement works, some of which, such as Fowler's at Leeds, Howard's at Bedford, and Ransome and Sims' at Ipswich, rank amongst the first establishments of the kind in the world. The situation of most of these agricultural works is not so much affected by the vicinity of the iron districts, as their having a large agricultural neighbourhood to fall back upon for customers, so that we find towns like Lincoln, Grantham, Shrewsbury, Gainsborough and Beverley becoming centres of engineering industry. Manchester, Leeds, Birmingham, Newcastle, Crewe and Glasgow are the chief localities where those vast engineering works are situated which have given England such a name on the Continent for all kinds of works, whether it be a locomotive, such as is turned out at the London and North Western Railway dépôt at Crewe, at the rate of one a day, or a huge iron girder bridge, such as the one that spans the Menai Straits, or whether it be the machinery for a cotton mill, such as is produced at Messrs. Platt's large establishment at Oldham, a sugar mill to go out to the West Indies, or a complete dock for the Cape of Good Hope. It is impossible, amidst our innumerable engineering establishments, to do more than allude to some of those well-known names, which have a reputation in foreign countries as great as they have in their own.

BUILDING STONES, GLASS, AND POTTERY.

ALTHOUGH the rocks and strata that compose our hills and valleys are chiefly valuable for the mineral treasures that they contain, they have also a value of a different kind in the building stones, sands, clays, and other materials which we extract from them, and apply to so many useful arts and sciences. Were it not for our great variety of building stones, we should not be able to show such splendid specimens of the architect's and builder's skill as are to be seen scattered over England and in our great cities, nor should we be able to indulge in substantial and well built houses, but have to fall back upon timber and other less durable substances. Granite is usually considered the noblest and best of our building stones, and especially where great massiveness is required, or great resisting power. It was once considered to be one of the oldest rocks geologically, but it is now known to be of different ages, and indeed may occur in the geological strata of almost any age. In the South of England, Devon and Cornwall abound with granite of a very fine kind, which has been employed in the building of London, Waterloo and Westminster Bridges, the Thames Embankment, the Portland Breakwater, etc. The greater part of the wild hills of Dartmoor is composed of this granite, the principal quarries being at Hingston Down, Tremator near Tavistock, and in Cornwall, near Liskeard, Penryn near Falmouth, Penzance and Madron. Looe and

Falmouth are the chief granite shipping ports. Granite quarries are also found in a small isolated patch at Mountsorel in Leicestershire, in the Isle of Anglesea, near Holyhead, and to a considerable extent in parts of Cumberland. Scotland is a great source of some of our best granites, which are very abundant in Aberdeenshire (shipped at Aberdeen and Peterhead), in the islands of Mull and Arran, and in Kirkcudbrightshire. The Mull granite is particularly beautiful, and of a delicate pink colour. Ireland, too, abounds in excellent granite in the mountains of Wicklow, Donegal, Galway and Down; so that with such plentiful supplies, we are not likely to run short of this valuable building stone. Granite, however, is not the hardest stone that England possesses, for there are certain rocks of volcanic or igneous origin, known as greenstones or basalts, which are so very intractable as to be almost useless for building purposes, though this very quality makes them valuable for road paving and "metalling." The principal supplies of these come from Penmaenmawr in Carnarvonshire, the Clee Hills near Ludlow (Shropshire), and Bardon Hill in Leicestershire. *Slates*, one of the most necessary of our building materials, are quarried from the oldest geological rocks (mostly of Lower Silurian or Cambrian date), and are principally found on the north coast of Cornwall at Delabole and Tintagel, and in North Wales, where are the celebrated slate quarries of Llanberis and Bethesda near Bangor, and Festiniog in Merionethshire. The former are shipped at Bangor, and the latter at Portmadoc, to which place a very curious railway brings the slates down from the moun-

tains. Though slates are very common, really good slates are not so plentiful, and the owners of valuable quarries, like those above mentioned, have gained vast fortunes out of them. Nearly all our remaining building stones are of lime or sandstone formation, though they vary much as to their geological age. *Mountain limestone*, of the coal measure or carboniferous age, is very common all over Great Britain and Ireland. While being a most valuable stone, it is not so much used, except locally, for building, being rather too brittle, but it is extensively employed for making lime and for a "flux" in the process of iron smelting. For this reason, limestone quarries are most generally found not very far distant from the iron districts. In Derbyshire, however, at Ashford and Bakewell, the limestone is of a very beautiful kind, and there is a considerable industry carried on in marble polishing. The limestones of an earlier age, called Devonian, and quarried largely in the south of Devon, are harder and more ornamental, and therefore are in more request with builders. The great Plymouth breakwater is built of this Devonian limestone, though it is an interesting fact, according to Professor Hull, that the portion below water had to be faced with granite, owing to the destruction caused to the limestone by innumerable boring shell fish. The *magnesian limestone*, or "dolomite," is one of our most beautiful building stones, though it is unfortunately soft and apt to wear away, as is seen in the case of the Houses of Parliament at Westminster. Mansfield, in Nottinghamshire, and from thence running up through the eastern portion of Yorkshire, are the principal

localities for these quarries. The most perfect building stones in England, whether for colour, durability, or treatment, are from the *oolite* formation, which are most developed in Gloucestershire, Dorsetshire, Wiltshire, and the northern part of Somersetshire—in fact, occupying the extensive high ground known as the Cotswold Hills, and extending thence south-west to the sea at Weymouth. Cheltenham, Stroud, Painswick, Bath, Box and Corsham are the most abundant localities in which the best oolite or “free” stones are worked; but they are also quarried pretty extensively in Oxfordshire near Burford (part of the same Cotswold range), in Yorkshire near Scarborough, at Ancaster in Lincolnshire, and also in Northamptonshire. The Portland stone, quarried on the Isle of Portland, near Weymouth, is one of the most celebrated stones in the world, and with it were built St Paul’s, the Custom House, and many of our London churches and principal buildings. It must be borne in mind, however, that though these valuable building stones come from the same formation of oolite, they are not all of the same geological age, or, indeed, of the same value. Of sandstones of the various formations there is no lack, though, as building stones, they very seldom approach the value of those already alluded to. Many of these, nevertheless, are of good colour and durability, and particularly those of the *Old Red* sandstone, the best being those of Devonian age. In the north of Scotland, at Arbroath in Forfarshire, and Caithness and Thurso, in the extreme north, the old red sandstones are of very great value as paving and flag stones. The *coal measure* sandstones

are seldom much used for building, being too coarse and absorbent of water ; but the millstone grit of this age is a very hard building stone, and much used in Manchester and the West Riding of Yorkshire, where there is an extensive area of country of this particular formation. The coal measure sandstones sometimes furnish excellent flag and paving stones, and especially at Elland in Yorkshire. The *Triassic*, or New Red sandstone, is largely developed in the neighbourhood of Liverpool (a great part of which is built of it), thence extending southwards into Cheshire, Shropshire and Worcestershire.

The *chalk* rocks, which are very abundant in the south and east of England, are mostly used for lime-burning, the most busy locality of this trade being at Burham, on the banks of the Medway. These are our principal riches in building stones, which are obtained from about 3000 different quarries in Great Britain and Ireland, producing about 17,000,000 tons of stone, of the value of four million pounds sterling.

If we turn now to the flat parts of the country, we shall find that, though they do not yield building stones, they are almost equally valuable for producing clays and earths, absolutely necessary for the carrying on of some of our greatest industries. Bricks and draining-pipes are made in vast quantities in all parts of England ; for there are very few counties, and particularly in the south and east, which do not contain more or less extensive beds of clay. Almost every large town has one or more brickfields in its neighbourhood ; but the chief brickmaking localities, as an

industry, are found in Kent, Essex and Norfolk. The banks of the Medway and Swale in Kent, and particularly at Faversham and Sittingbourne, are lined with large brickfields, where millions upon millions of bricks are annually turned out; and the importance of the trade may be gathered from the fact that over 40,000 persons are employed in it. Clays are also dug of a special character, and for a special purpose. In Cornwall, and particularly in the neighbourhood of St Austell, and also at Lee Moor in Devonshire, a large industry exists of digging and preparing china clay for the Staffordshire potteries. It is really a kind of granite rock in a decomposed state, and is used in the manufacture of porcelain to the amount of about 130,000 tons a year. From the tertiary beds of Devon and Dorset at Teignmouth, Poole and Wareham, another kind, called ball clay, is dug, and used for earthenware; all these clays being shipped from St Austell and Poole to Runcorn in Cheshire, whence they go by the Bridgewater Canal to the Potteries. For the same manufacture, flints are dug from out of the chalk and sent to the same district, a busy, smoky portion of North Staffordshire, some twelve miles long, embracing the populous towns of Stoke-upon-Trent, Hanley, Burslem, Tunstall, Newcastle-under-Lyme, and Longton. The trade of making pottery in all its multitudinous branches, from the coarsest stoneware to the most elaborate and expensive china, has so greatly increased, that the population of the Staffordshire potteries during the present century has mounted up from 23,626 to 187,225, though a very large number of these are engaged also in iron and coal works. But

of the whole pottery population of Great Britain, two-thirds certainly are found in Staffordshire. Worcester has long been celebrated for its china, as are also Coalport and Broseley in Shropshire, Lambeth, where are Messrs Doulton's large works, and Watcombe in Devonshire, and there is a well-known pottery in the north-west of Ireland at Belleek. Other potteries there are in our large towns, but those just mentioned are the best known. The pottery trade is not a very healthy one, owing principally to the quantity of dust given off, and the heat of the stoves in which the ware is dried. The manufacture of tiles for the interior of churches and houses has become a very extensive branch of the pottery trade, and some of our English makers at Stoke-upon-Trent and Broseley have obtained a celebrity all over the world. There is also a large tile factory at Lugwardine in Herefordshire.

The glass trade is a good deal more scattered over England and Scotland than that of pottery, though the various kinds of glass produced are curiously restricted to certain districts. The chief localities are Newcastle, Sunderland and the banks of the rivers Tyne and Wear generally, where there are factories for both flint and plate glass; St Helen's and Ravenhead in Lancashire for plate glass; Birmingham and Stourbridge, in Worcestershire, for crown-sheet glass, there being at Spon Lane, near the former town, a celebrated manufactory of lighthouse glass; Glasgow and Alloa in Scotland for flint glass; Castleford in Yorkshire and the valley of the Don for bottle glass; while a considerable quantity of flint and plate is made also on the Lambeth side of the Thames. London,

Birmingham, Newcastle and Sunderland are also the seats of some well-known factories of stained glass for decorative purposes. The purest and best sand used in the glass manufacture (and especially for flint glass) comes from Alum Bay in the Isle of Wight and Fontainebleau in France, while the neighbourhood of Stourbridge yields the finest fire clay for producing the necessary glass pots. In addition to the making of glass, a large body of persons is employed in glass cutting and finishing generally for all kinds of ornaments, such as polishing, embossing and painting, etc. The majority of the glass cutters are found in Birmingham, though all large towns will contain some of these trades.

TEXTILE TRADES.

AFTER the industries of coal mining and iron making, there is no branch of manufacture in which Great Britain and Ireland are so deeply interested as that of textiles, or, in other words, the spinning of yarn from the raw material, and afterwards weaving it into manufactured goods, whatever they may be. There are several groups of these great textile trades—viz., cotton, wool, flax, silk, hemp and jute—all of which employ a vast number of people. About two and a-half million persons work together in the various factories scattered over the country; and when we add to these the numbers that are also dependent upon

this business in making the machinery for the factories, bringing the raw material, and carrying away again the made-up goods, there are certainly not less than four millions who gain their daily bread by the textile trades.

We will deal first of all with the COTTON trade, as being the largest in the numbers employed, and altogether the one in which the prosperity of Great Britain is most bound up. We cannot grow cotton in this country, and are, therefore, obliged to buy it from other parts of the world, which we do in enormous quantities, spending from fifty to sixty million of pounds sterling every year on raw cotton. Our chief supplies come from America, which sends us more than half; and if America fails us by any chance, as she did in 1861, when the Northern and Southern States were at war with each other, it is a terrible thing for our cotton trade in England, and creates great distress in our cotton districts. India also sends us large quantities, as well as Egypt; and a small quantity comes from Brazil, in South America. The great centres for buying and selling cotton in England are Liverpool and Glasgow, the former especially being the seaport to which the cotton is brought by ship, and then forwarded by rail to the inland parts of Lancashire, in which the bulk of the cotton factories are situated. The city of Manchester, situated on the black, dye-stained waters of the Irwell, Irk and Medlock, is the metropolis of all the cotton districts; but although there are several large factories in and close to the city, Manchester itself has of late years become rather the centre in which the warehouse

business is done, leaving the actual manufacture to be carried on in other towns and villages. The country for many miles around Manchester bristles with tall chimneys and huge square factories, which, whatever may be their conveniences, certainly have no claims to beauty of construction. The chief cotton towns, which are connected with each other by one of the most intricate railway networks in the kingdom, are Preston on the Ribble, Blackburn, Bolton, Bury, Wigan, Leigh, Chorley, Accrington, Haslingden, Burnley, Clitheroe, Colne, Darwen, Padiham, Bacup, Todmorden, Heywood, Middleton and Ashton-under-Lyne; while on the borders of Cheshire are Stockport, Hyde, Dukinfield and Staleybridge; but there are so many populous industrial villages, entirely occupied with the cotton trade, interspersed between these different towns, that it is often difficult to say where one leaves off and the other begins. The Lancashire cotton district extends northwards as far as Lancaster itself, and eastwards to the Yorkshire border, where the cotton trade gradually gives place to that of woollens and cloths. In addition to the cotton spinning and weaving (and in many cases these two branches of industry are separate, though frequently carried on by the same manufacturer), there are a great number of necessary trades dependent on that of cotton. For instance, dyeing and bleaching the cotton goods when woven, employ a very large number of persons, and we generally find these established as far from the towns as possible, where both water and air are purer than they would be close to the smoke of the factories, although in the present day the method by which the bleaching is

carried on by the aid of chemical processes, does not require so much exposure to the air as formerly. Calico printing, so as to obtain those pretty patterns on cotton goods, which so please the eye of the Eastern natives, to whom the bulk of these goods is sent away, is another very important branch, and, as a rule, the printworks are usually found on the outskirts of the towns, preferring the neighbourhood of the bleach and dye works to that of the factories. In the neighbourhood of Glasgow and Paisley, where a considerable cotton trade exists, bleaching and dyeing in the open air is much more practised than in Lancashire, and especially in the branch called the Turkey red trade. While on the subject of dyeing, it is curious to note how all the world is laid under contribution for the materials. Cochineal comes from the Canary Islands and Mexico, cutch from India, indigo from Bengal and Madras, madder from France, Holland, Turkey and Italy, etc.—showing that there is scarcely a single manufacturing process in which we are not in some way or other dependent upon other countries for carrying it out. Besides Lancashire and Lanarkshire, cotton spinning is carried on in but few places in Great Britain, as Macclesfield, Nuneaton in Warwickshire, Bristol and London. Most of the cotton towns have some specialty of cotton spinning or weaving; one town being celebrated for the fine yarns that it produces, another for producing a particular class of goods, as, for instance, Paisley in Scotland for cotton thread, Middleton in Lancashire for tapes and small wares, Oldham for velveteens and cords, Bolton for fine yarns (known as Bolton “counts”), Blackburn for cali-

coes, Lymm in Cheshire for fustian cutting, etc. The extent and importance of the cotton trade is best understood by giving the number of spindles which are spinning yarn, and the number of workpeople employed in it. The reason why spindles form such a good gauge of the trade is, because it shows how much cotton is consumed in spinning the yarn, that has afterwards to be woven into goods, which are spoken of generally as "piece goods." According to the latest returns, there are in Great Britain and Ireland 39,500,920 spindles engaged in producing yarn, and 494,911 power looms engaged in weaving it. Like our iron furnaces, however (page 9), these are not always busily at work, for in times of trade-depression, a good many cotton mills either run short-time or are stopped altogether. The best way of understanding how enormously our cotton trade surpasses in importance the cotton trade of other countries, is to show how many spindles these other countries possess. While, therefore, we possess nearly 40,000,000, America (our greatest rival) possesses only 10,000,000; France, Belgium, Germany, and the Continent generally, only 20,000,000; and India 1,200,000. Out of the spindles possessed by the whole world, Great Britain has considerably more than half. Of the numbers employed in the factories in the actual spinning and weaving, 185,472 are men, and 297,431 women, making a total of 482,903. This of course does not represent the great body of people engaged in trades dependent upon the cotton trade, or the large mercantile populations of Manchester, Liverpool and Glasgow, engaged in buying and selling, forwarding,

warehousing and packing cotton and cotton goods. As to our customers, it is difficult to say in what part of the world they are not to be found. We have such a reputation for spinning good cotton yarn, that we export a great deal every year to Germany, Holland, Italy, Turkey, India and Japan; while our cotton goods, whether plain, printed, or mixed with other textile materials, are sent in enormous quantities (3,610,126,000 yards during 1878) to India, China, South America and Australia. Our cotton trade, however, will probably not be so large in future years as it has been, and for these reasons—one, that we have in times of prosperity started too many cotton mills and produced more cotton goods than we can get rid of profitably; the other, that America and Continental nations have very much increased their machinery both in quantity and quality of late years, and can therefore produce yarns and cotton goods for their own countries, which we used to supply in former days. France does not take so much yarn from us as other nations, because she can spin finer yarns than we can, or do. India has of late years started cotton spinning on her own account, and as her trade prospers, she will be able to supply her own people without coming to us.

The next great group of textiles which we must discuss is that of **WOOLLENS**, which, like cotton, also embraces several important trades, such as the manufacture of cloth, worsted, alpaca, shoddy, and a variety of sub-divisions. Of these, woollen cloth and worsted employ by far the greatest number of workpeople, and the largest amount of capital, and though what are called generally the "clothiers' districts" are tolerably

localized, we find the various branches of the trade more scattered over the kingdom than that of cotton. The woollen trade also differs very much from the cotton trade in this respect, that while we cannot grow our own cotton, we can grow our own wool, although so vast a quantity is used, and so many different kinds, that we have not sufficient sheep to supply us; we are therefore obliged to import large quantities, principally from Austria, Silesia, Russia, the Argentine Republic in South America, and our Australian colonies of Victoria, New South Wales and Queensland. The bulk of the woollen cloth, and almost all the worsted trade, may be said to be confined within the West Riding of Yorkshire, commencing at Todmorden, on the Lancashire border, where the cotton mill and the woollen mill meet together and merge into each other. From thence to Leeds the woollen trade predominates, being largely carried on in the picturesque hills and dales of the Aire, Calder, Wharfe, and other tributary streams. Like Lancashire, industrial woollen and cloth villages without end connect the towns into one great manufacturing focus, the chief points being Bradford for worsted yarns and what is known as the "stuff trade," of which this fast-increasing town is the headquarters; Saltaire, a place of quite recent growth, where the alpaca manufacture is carried on; Halifax and Huddersfield, for woollen and worsted goods and coatings; Wakefield, for woollen hosiery; Dewsbury, for army clothing, blankets, and druggs; Rochdale (in Lancashire), for flannels; Leeds, the great centre of the Yorkshire cloth trade; Batley, for shoddy. Amongst the smaller towns are Keighley,


Bingley, and Shipley on the Aire; Otley on the Wharfe; Sowerby Bridge, Elland, Cleckheaton, Brighouse, Heckmondwike and Morley in the centre of the Riding, while a considerable trade is also carried on in the south of the county, amongst the wild moors of Saddleworth and Holmfirth. Stroud, in the picturesque valley of the same name amongst the Cotswold Hills in Gloucestershire, is the seat of a busy, though scattered, cloth trade; as are also Bradford, Frome, and Trowbridge in Wiltshire, producing what are called West of England cloths. Newtown, in Montgomeryshire, is a rising place, the headquarters of the Welsh flannel trade; and in Scotland there is a large industry, both factory and domestic, at Hawick and Galashiels on the Tweed, where a great deal of woollen hosiery is produced, and also a considerable woollen trade in Aberdeenshire, Perthshire and Forfarshire. The woollen trade gives rise as well to an enormous quantity of domestic industry, wool spinning and knitting being a great source of occupation in some parts of the country, and particularly in Scotland. Some of the woollen and worsted mills of the present day are on a magnificent scale, and those at Saltaire, near Bradford, where the late Sir Titus Salt established the alpaca trade, and those at Manningham, are amongst the most complete factories in the world. The alpaca and llama wools are imported by us from South America (New Granada, Peru and Chili), and their introduction a few years ago was a great feature in the Yorkshire clothing districts. Although the manufacture, in a general way, resembles that of cotton, there are many important differences, owing to the nature of the textile. The machinery for

spinning wool is much heavier, and runs much slower than cotton machinery, and some of the cotton processes, such as drawing and roving, are not necessary in wool-spinning. In a woollen factory, therefore, there is less vibration, noise and dust, and consequently the woollen operatives are healthier than those in cotton. Shoddy, which is made at Batley, Dewsbury and Cleckheaton, is a mixture of any old textile material added to the wool for cheapness' sake, and shoddy clothes, made up of this mixed cloth, are exported all over the world. Most of our worsted stuffs, made altogether of wool, are exported to America, Australia, China and Holland. France, Germany and Italy are also customers for worsted stuffs, mixed with other materials ; and Brazil takes the greater part of the woollen rags and wraps. The number of spindles and power-looms at work in the woollen trade is nothing to compare with those of cotton, being but 3,337,607, to which must be added 2,096,820 for worsted, and 71,843 for the shoddy factories—total, 5,506,270. The power-looms for weaving number 412,248; and on an average, about 280,000,000 yards of worsted stuffs are exported every year. A very important branch of the woollens is the carpet manufacture, which is pretty well scattered over the kingdom, though each place has a reputation for some particular carpet. Brussels carpets are principally made at Wilton, near Salisbury, and Kidderminster in Worcestershire, while, curiously enough, the carpets so well known by the latter name, are scarcely made in that town, but rather at Kilmarnock. The patent machine-made Axminster carpets are not made at Axminster, but at Glasgow and Kilmarnock in

Ayrshire, and to a less extent at Dewsbury in Yorkshire; but the velvet pile and tapestry carpets are made at Halifax and Kidderminster, and partly also at Leeds. The way in which the carpet trade has deserted one town where it was long settled, and fixed itself in another, is a very curious feature of industrial history. The carpet factories of the present day are conducted on the most complete scale, producing very beautiful designs at an astonishingly cheap rate. The number of work-people employed in the woollen worsted and shoddy factories is 116,156 men, and 154,192 women—total, 270,348.

FLAX, HEMP AND JUTE; SILK AND LACE.

THE group of textiles which we are now about to examine, though not employing such vast bodies of operatives, is of very great importance and interest. The **FLAX** and **LINEN** trade is essentially one belonging to the North of Ireland, though it is by no means confined to that part of the kingdom, as it is also a great Scotch industry, and is found to a considerable extent in Yorkshire. Flax is not very much grown in England, though there is a small district near Patrington, in the East Riding of Yorkshire, where it is cultivated; but it is the staple crop in Ulster, and the farmers of the North of Ireland would come off badly if there was no flax to fall back upon. The principal



counties in which the cultivation is carried on are Donegal, Antrim, Down, Londonderry, Tyrone, Cavan and Fermanagh, and to a smaller extent in the provinces of Leinster, Munster and Connaught, as the flax does not appear to thrive so well in these latter as it does in Ulster. The scutching mills, where the flax stem is broken and roughly cleaned, are generally in the neighbourhood of the farms where it is grown ; but when ready for market, the flax is taken to towns, such as Ballymena in Antrim, and Cookstown in Tyrone, to be sold to the linen manufacturers. Belfast, the headquarters of the linen trade, has prospered so greatly that it has absorbed most of the trade of the country in this respect, and is now the second largest town in Ireland. The linen district extends southwards as far down as Armagh, and embraces the towns of Lisburn (which once had a great reputation for brown linens), Portadown, Lurgan, Banbridge, Hillsborough, etc. In Scotland, the principal linen districts are found in Fifeshire, Perthshire, Forfarshire, Kinross-shire, and Clackmannan, where a very large industrial population is maintained by this branch of manufacture, both in factories and weaving at home. Leeds is the principal seat of the English flax and linen trade, and has some of the finest flax mills in the world, particularly those of Messrs. Marshall. Flax spinning is carried on rather largely in some of our south-western counties, such as Wiltshire, and Dorsetshire (near Bridport) ; but the preponderance of the Irish trade is shown by the fact that England possesses 191,000 spindles, Scotland 265,000, and Ireland nearly 809,000. There are more factories in Scotland than in Ireland, but the latter are by far the

most extensive. The flax spinning trade is not healthy a one as those of wool and cotton, as the material gives off such immense quantities of dust. We import a great deal of flax, to be spun and woven in Great Britain and Ireland, the most of it coming from Italy, Russia and Belgium—the latter count sending dressed flax, while the undressed or rough flax comes from Russia and Holland. On the other hand, we send away dressed and undressed flax to America, flax yarn to Spain, Germany, Holland and Belgium, and linen goods principally to the United States and Australia. About 190 million yards of white or plain linen are thus disposed of every year.

Hemp is scarcely grown in England at all, but is imported in pretty large quantities from Russia and other kinds, known as Bombay hemp, Sunn and Manilla hemp coming from India, and the fibre of the *Phormium tenax* from New Zealand. The principal seats of the hemp manufacture, as also that of jute, are Dundee on the Tay, and Arbroath in Forfarshire. Jute, which is the fibre of a plant named *Corchorus*, is principally cultivated in Bombay, and largely shipped from there to Dundee, though there are also a few jute factories in and near London. The hemp is used chiefly for ropes and cordage, tarpaulin, and the jute for canvas and sacking, sailcloth and bags. An enormous business is carried on at Dundee in spinning and weaving jute, the operations resembling those of the flax manufacture, though of a coarser and rougher nature. About 36,000 persons are employed in the jute factories throughout the kingdom, which have 213,000 spindles. Germany, the United States, and Sweden are our best

customers for jute goods and sailcloth, of which we export four million yards annually.

The **SILK** trade is a very important branch of textiles, though it has been in a most depressed condition for a few years past. Silk production, or the silk-worm industry, is very little carried on in England, the climate of which does not seem to be favourable to it, and most of the silk sent to this country is produced in China, Japan, India and Italy, though silk-worm cultivation is being tried, with some success, in our Australian colonies. France is also a great silk producer, but then she has such an enormous manufacture that she never has any silk to spare, and is obliged to import for herself. It is a singular thing that the reeling of the silk from off the cocoons is an industry almost peculiar to Italy, and the silk comes to us in England in rough hanks called "books," containing skeins from eighty to ninety inches long. Silk spinning and weaving in this country are principally carried on at Macclesfield and Congleton, two Cheshire towns very near the Derbyshire border, and also at Derby itself, and Nottingham. Lancashire has a considerable silk trade, there being a good deal of silk embroidery made at Manchester, and hand-loom weaving at Middleton and Leigh for broad silk goods. Coming south, we find the little town of Leek in North Staffordshire occupied in making sewing silk. Silk spinning is to be found at Malmesbury in Wiltshire, and Haverhill in Cambridgeshire, while silk weaving has been one of the oldest of London trades (descending from the Huguenots) in the districts of Spitalfields and Bethnal Green, where rich furniture-silks

and velvets, with silk trimmings, are produced in great abundance. The silk spinning processes are tolerably similar to those of other textiles, allowing for the difference of material; but they have this peculiarity, that the greater portion of the workers are women and children. Silk weaving, and especially in the heavier class of goods, such as velvets, is done by men, who have been brought up to it from father to son, and who turn out the most beautiful designs. We import every year from four to five million pounds of raw silk, as well as great quantities of silk and satin stuffs from France and Belgium, together with velvet and silk plush. There are about 850,000 spindles in our silk trade, and 41,000 people engaged in the factories.

Having now glanced at our chief textile manufactures in Great Britain and Ireland, it will be well to give a very brief table of them, so as to show their relative importance.

Textile	Factories	Spindles	Powerlooms	Operatives
Cotton ...	... 2674	39,527,920	514,911	482,993
Woollen ...	... 1732	3,337,607	56,944	134,344
Shoddy ...	... 137	83,702	2,110	5,079
Worsted ...	... 693	2,096,820	87,393	130,925
Flax ...	... 400	1,264,766	40,448	108,806
Hemp ...	... 58	22,043	74	4,780
Jute ...	... 117	212,676	11,288	36,354
Silk ...	... 706	842,538	12,546	40,985
Lace ...	... 283	...	...	10,209
Hosiery ...	... 186	...	...	14,992
Hair ...	... 36	...	...	1,731
Elastic Web ...	... 83	...	...	4,438
Total ...	7105	47,388,072	725,714	975,636

The last four industries in this list are of but second-rate importance when compared with the others, though of very great importance to the districts where they exist. The LACE trade, or what is termed the machine-lace trade, is principally confined to Nottingham and the small towns and villages within a radius of twenty miles. The neighbourhood of Derby is a good deal occupied with lace making, which, especially in the dressing and finishing warehouse, employs a great many women and girls. Nor must we forget the little town of Tiverton in Devonshire, to which Heathcote, one of our most ingenious inventors in the lace trade, removed all his mills when his machines were destroyed by the Nottingham mob in 1816, since which time a brisk trade has been carried on there. Hand lace-making, or what is known as pillow lace, being easily acquired and wanting no capital, is a branch of the industry which is to be found, here and there, all over the kingdom. Still, even this is localised a good deal, and some counties are particularly famous for it. In the south of Devon, for instance, there is a district full of pillow lace makers, bounded on the east by the Axe, on the west by the Exe, on the north by the Bristol and Exeter Railway, and on the south by the sea, and comprising the towns of Honiton, Seaton, Colyton, Ottery St Mary, and Sidmouth. In the shires of Buckingham, Oxford and Bedford, pillow lace is an important industry, not in the towns, but in all the little villages and hamlets, where the art of making it is taught in dames' schools, and where the lace itself can be produced very cheaply. Lace making by hand is seldom

performed in a factory—that is to say, by a number of workers congregated in one building; and the only instance is at Limerick, where “guipure” lace is made on this system.

The **HOSIERY** trade is carried on both in factories and very largely in the cottages of the workers, stocking weaving, in particular, being a great domestic occupation in Leicestershire, which is the headquarters of the hosiery industry, although it branches off also into the counties of Nottingham and Derby. Leicester and Loughborough have become very considerable factory towns, and the trade occupies a good many persons in the small towns and villages, such as Hinckley and Lutterworth, and also between Nottingham and Mansfield. Leicester itself is more busy with woollen hosiery manufacture (like the Scotch towns of Hawick and Galashiels, mentioned before); Nottingham takes charge of the cotton, merino, and silk hosiery; and Hinckley of the common cotton goods; so that we see the same singular localisation of trade which we have so often noticed before. The elastic web trade—which combines india-rubber with cotton, silk, or whatever the textile may be, so as to make braces, boot sides, gaiters, etc.—is a rather new branch of hosiery, and is limited to two towns and their neighbourhood, viz., Loughborough in Leicestershire, and Coventry in Warwickshire. The hair trade—for weaving hair for stuffing mattresses and making chair-seating—is a smaller one than any that we have described, and has no particular locality. The factories are few, and are dotted about the country—several in London and Surrey, and also in

Suffolk and the borders of Cambridgeshire, where, in the Stour Valley, a considerable population is maintained in the town of Halstead, and the villages of Long Melford and Glemsford, by making hair-seating. There is one other textile industry to which we must allude, and that is, **ROPE** and cordage making, which, though scattered through our large cities and towns, is a very important industry in connection with the hemp and fibre trades; but to a certain extent it has been diminished by the employment of wire ropes for many purposes for which fibre was formerly used. Twine and string are very largely spun by hand at Bridport in Dorsetshire; and extensive rope factories are to be found in London, Liverpool, Birmingham and Bristol, though ropewalks, on a large or small scale, exist in the outskirts of most towns of any size. Having briefly reviewed the geographical conditions of our textile trades, our next subject will be the materials made out of them in the shape of clothing.

The ultimate end of all spinning and weaving being to convert certain materials to the use and comfort of man, we shall not be surprised to find that a great amount of clothing is made, and that a variety of trades are dependent upon its production. These trades, however, are so widely spread over all our towns and villages, that it is impossible to assign any special locality to the majority of them, though some are congregated in one place sufficiently to characterise it. Gloves, for instance, are made more particularly at three towns, Worcester and Evesham in Worcestershire, and Yeovil in Somersetshire; and a good deal

of the woollen and cotton glove trade is carried on in Leicestershire and Nottinghamshire.

In the same way that a glovemaking may be found in any town in the kingdom, so may a hatter; but, as a trade, hat-making exists principally in London, Atherstone (a small town in Warwickshire), Oldham and Stockport, the two latter places being principally engaged in making felt hats. Women's hats and bonnets, when made of straw plait, give rise to a very important industry, employing a vast number of young people, largely in London, but chiefly in the towns of Luton and Dunstable in Bedfordshire, and Hitchin and St Albans in Hertfordshire, the first-named place almost assuming the appearance of a factory town. The straw-plaiting industry resembles somewhat the pillow lacemaking, inasmuch as it is carried on in the villages for a considerable distance around these towns; and the plait is brought to market at Luton, and there sold to the manufacturers to make up into bonnets and hats. The extent of the industry may be estimated by the fact that nearly 40,000 persons are employed in it, though a great number consists of very young children, who work in the various "plait-schools" in the villages. Boots and shoes form another branch of the clothing trade, for which certain towns are known. The leather trade—*i.e.*, tanning and currying—is pretty well dispersed throughout the country, though Bristol may be considered as the headquarters of the tanners. Naturally, too, there is a large shoe-making trade at Bristol, though not so important as that at Northampton, which place is almost entirely dedicated to St Crispin. Leicester, Ipswich and Stafford

are other towns with an important boot and shoe trade; while at Newcastle-under-Lyme in Staffordshire, boots and shoes are turned out almost wholly by machinery.

AGRICULTURE.

WE must now turn our attention to agriculture, a very different kind of industry from that which we have been hitherto examining, but one which is not less essential to the prosperity of a country. Great as are the riches accruing to England from her mineral treasures, and the various manufactures depending upon them, her backbone may be said to be formed of the agricultural interest—of her lands, crops and live stock, of the owners of the soil whose capital is invested in it, and of the farmers and the peasantry, whose intelligence and labour enable the land to give forth its treasures. Great Britain was an agricultural country long before she was a manufacturing one, as indeed every country must be, for it is the first instinct of man's nature, however rude and uncivilised he may be, to obtain from the land on which he lives sufficient to satisfy his requirements of subsistence, ere he begins to think that he has any further wants to be satisfied. Different as the industry of agriculture is from that of manufactures, they are yet most intimately connected with each other in many ways, both natural and artificial. The farmer and the miner are equally interested in the outline of the land, the geological constituents of

the rocks, and the capabilities of the soil ; while the rivers and streams that give water-power to our manufactures, and convey our commerce to the sea, are the very life-blood of the country, in shaping and forming the valleys, and fertilising the lands through which they flow. Moreover, as knowledge has increased and science developed, agriculture has become more and more allied to and dependent upon our manufactures. Engineers and chemists are now as necessary to the cultivation of a large farm as they are to the carrying on of an iron work or the superintendence of a bleaching establishment ; and each day reveals the increasing necessity for a good farmer to know something of other sciences besides that which is peculiarly his own.

Great Britain shows the same diversity of character in her agricultural resources as she does in her manufactures, mainly owing to the number of distinct geological formations which are found within her comparatively limited space, and to the great variety and extent of her hydrography or water-supply. Those who wish to study minutely the agriculture of the country, should make themselves acquainted with these two branches of knowledge, for on them the character of the soil and the nature of the crops chiefly depend. It is to them, too, that are owing those changes of scenery and landscape which make England so dear to the tourist. What can be of greater contrast than the sunny hop-gardens of Kent and the bleak fells of Cumberland, the wooded flats of Essex and the moors of northern Yorkshire ? And the products of these different parts of the country vary as much as their

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external appearances. The total area of England and Wales is about $37\frac{1}{2}$ million acres, of which 27 million is under crops, fallow, and pasture, while the remainder is occupied with orchards, market gardens, woods, plantations, uncultivated lands, roads, etc. The crop of which there is the greatest proportion is, of course, wheat, in which certain counties excel more than others, though no county in the kingdom has quite half in wheat. It must be remembered, however, that the quantity of land given up to wheat cultivation is fluctuating, and shows a tendency to decrease, farmers finding it more profitable to grow cattle than corn; and one reason, perhaps, which has contributed very much to this is, that America, Austria and Hungary, Russia and Australia grow and send over to us such immense supplies of wheat every year, that it keeps the prices down and makes our bread cheap. Half the wheat grown in the United Kingdom is grown in eleven counties, viz., Lincolnshire, Yorkshire, Essex, Norfolk, Suffolk, Cambridgeshire, Kent, Hampshire, Sussex, Wiltshire, Gloucestershire; and nearly one quarter of the whole is grown in three counties—Lincolnshire, Yorkshire, and Essex; Lincolnshire, indeed, reaps and thrashes above one-fifth more wheat than all Scotland and Ireland put together. The average yield of English wheat is about 30 bushels to the acre, which is higher than the yield of other European countries, Holland being $28\frac{1}{2}$, Belgium $20\frac{1}{2}$, France $13\frac{1}{2}$, Hungary $8\frac{1}{2}$, Russia $5\frac{1}{2}$, which shows how much is due to equable climate and good cultivation. The crops which characterise our chief counties are as follows:—*Kent* is watered by the Thames, Medway,

Swale, Rother and Stour, and produces cereals, viz., wheat, barley and clover, with extensive gardens of hops and fruit. *Middlesex* is principally noted for its market gardening and fruit growing; and the same may be said of *Surrey*, in which, however, some wheat of excellent quality, together with hops, is produced. *Sussex*, with its downs, is more of a sheep farming county. *Hampshire* grows roots, clover, beans, wheat and turnips. *Wiltshire* and *Dorsetshire* are very similar, though they do not contain such good land. *Devonshire* is principally famous for its cream, its cattle, and its cider, and *Cornwall* for its potatoes. *Somersetshire* and *Gloucestershire* both show many varieties of soil, and are great wheat-growing counties; while *Herefordshire*, famous for its cider, produces a fair amount of corn and a good proportion of hops. It is also celebrated for its fine breed of cattle. *Oxfordshire* has several varieties of geological formation, and grows the usual cereals. *Shropshire*, from its neighbourhood to the Welsh borders, is well adapted for sheep farming and root crops. *Warwickshire* possesses a good deal of very fertile land on the New Red Sandstone, and, besides the ordinary farming crops, produces quantities of vegetables for the manufacturing districts of Birmingham and Staffordshire. In the eastern counties we find a somewhat different state of things, the climate being drier. *Essex* is noted for its root crops, while the neighbourhood of Romford sends great quantities of vegetables to London. *Norfolk* is one of the best farming counties in England, and is especially noted for its light land husbandry, its barley, its sheep farming, and bullock feeding.

Both in Essex and Norfolk agriculture is carried on in the most scientific manner, and all the newest systems and appliances are sure to be found in these counties. *Suffolk* is of more ordinary character, though possessing a good many varieties of soil and surface. *Lincolnshire* is by nature not so good an agricultural county as the others, owing to its having such extensive barren heaths and flinty wolds in one part, and so much marsh-land in another ; but draining operations have been carried on so extensively, and waste land reclaimed and so splendidly farmed, that Lincolnshire is now one of our best wheat-producing counties. In its extreme north-west is a peculiar district called the Isle of Axholme, where spade husbandry is principally practised, and great quantities of vegetables are grown for Sheffield and other markets. *Yorkshire* is of such enormous size that it presents entirely different outlines of country and soil, and almost different climates, the East Riding being drier and clearer than the West, because the latter catches the rain from the Atlantic ; but, on the other hand, the East Riding suffers from the cold winds of the German Ocean. The Wold district, in this Riding, is noted for its large farms and extensive flocks of sheep, while the Vale of York produces wheat, oats, beans, etc., and the district of Holderness, a good part of which has been reclaimed from the estuary of the Humber, is noted for its wheat crops. Some flax is also grown here. The North Riding is characterised by limestone fells and rich grass-lands in the vales beneath. The West Riding, being so much given up to manufactures, is not a very great agricultural district, though the usual

crops are grown in it, together with a few special ones, such as potatoes, near Goole and Selby, and liquorice, near Pontefract ; while teasle for the use of the cloth districts, and woad for dyeing, are grown along the sides of the Ouse and Trent. A considerable amount of potatoes is grown in Cheshire for the Manchester market, though, as a rule, Cheshire is the great dairy farming and cheese making county of England. Dairy farming is very much increasing in Great Britain, and it is a very valuable and productive branch of agriculture. We possess, roughly speaking, about 2½ million cows, the most noted breeds being those of Norfolk, Ayrshire, the Channel Islands, Hereford, Sussex, Devonshire, Galloway, Wales, the Scotch Highlands, and County Kerry in Ireland. Of course, wherever there are rich grass-lands and sufficient attention is paid to the breed of cows, there will be dairy farming ; but as an industry we shall find it principally in Cheshire, Staffordshire and Gloucestershire. Cheese making is, ordinarily speaking, carried on, more or less, in most farming counties ; but certain localities, such as Cheddar in Somersetshire, Stilton in Huntingdonshire, and Coverdale in Yorkshire, are celebrated for their special character of cheeses, and in North Staffordshire and Derbyshire quite a new system has been adopted from America, of the farmers co-operating together and having their cheeses made in a factory, as a separate industry.

FOOD AND DRINK.

IN the previous chapter, we showed the different localities which provided us with our bread and meat. Fruit is a considerable item in the industries which affect our provisions, and in England and Scotland there are about 157,000 acres given up to this branch. Apples and pears for eating, as also for cider and perry-making, are principally grown in the counties of Hereford, Gloucester, Worcester, Devon and Somerset, the annual average yield of apple returns being about 200 bushels per acre. Kent is famous for its cherries, damsons, plums and greengages, and immense quantities of gooseberries and currants are grown in Kent, Worcestershire, and Gloucestershire, and sold for preserving. Filberts and cobnuts are another specialty of Kentish produce; Cornwall is noted for its raspberries; while strawberries are cultivated in enormous quantities in the market gardens of Middlesex, Surrey, Kent, Devonshire, Cornwall and Worcestershire. Wales is not much of a fruit-growing country, except for cider apples. Scotland grows great quantities of strawberries, gooseberries, currants and damsons, the chief fruit-counties being Perth, Lanark and Edinburgh. The consumption of fruit is so largely increasing, however, that we are obliged to import very largely from the Continent, while canned fruit is also sent to a considerable amount from Canada and America.

Over 38,000 acres are cultivated for vegetables; and as the neighbourhoods of our large towns get built

over, and the market garden disappears, vegetable growing becomes daily a more important industry. The districts in Essex about Romford, Barking and Stratford, in Middlesex about Brentford and Twickenham, and in Kent along the Thames to Gravesend, are largely occupied with market gardens. The most noted localities for asparagus are Mortlake and Fulham, Colchester and Gravesend; for sea-kale, all about Deptford, and in the Thames Valley in Surrey; onions, Bedfordshire and Huntingdonshire (St Neots); brocoli and cauliflower, Cornwall; potatoes, the alluvial lands of Yorkshire and Lincolnshire, and the Lothians of Scotland. Hops are grown chiefly in Kent, Sussex, Surrey (near Farnham), Worcestershire, Herefordshire and Hampshire, some of the Kentish farms consisting entirely of this crop. Hop drying in "oast" houses is also extensively carried on in the hop districts, while malting, as an industry, is found in greatest force at Newark and Lincoln; but, wherever brewing is much practiced, there are sure to be malsters in the vicinity. Burton-on-Trent is the largest brewing town in Great Britain, and perhaps in the world, and especially for the class of beer known as bitter ale, which is exported to India and the colonies in such enormous quantities. Stout and porter are brewed chiefly in London and Dublin, the breweries in both places being of gigantic size, and employing a great number of people. Nearly every place of any size in the kingdom has one or more breweries, some of which, as at Edinburgh, Alloa, Romford, Stratford-on-Avon, etc., are more than locally celebrated, while others may have a reputation in their own neighbourhood.

Salt, an essential addition to our food, both as a condiment and for preserving purposes, is a commercial industry in only two counties : Cheshire, where a very large population is employed in the salt mines and manufactories of Northwich, Over, Winsford, Middlewich (the termination "wich" always signifies that salt is or has been found there); and also in the county of Worcester, at Stoke and Droitwich, where the manufacture is largely carried on by evaporation from the salt springs of the New Red Sandstone. The Cheshire salt is principally sent by the Weaver River to the Mersey at Runcorn, where it is shipped abroad, but the Worcestershire salt works have to depend upon the railways for their transport. A great deal of salt is used in fish curing, an industry which is naturally found all along our sea-coast. The chief of the British fisheries, in which great numbers of the hardiest of our population find employment, are Yarmouth in Norfolk for the herring and North Sea fisheries, Grimsby in Lincolnshire for cod and deep-sea fish, Mevagissey and St Ives in Cornwall for pilchards, Brixham in Devonshire, Brighton and Hastings in Sussex, Deal in Kent, Whitby and Staithes in Yorkshire; in Scotland, Berwick, Newhaven near Edinburgh, Loch Fyne (Argyleshire) for herrings, Findon near Aberdeen (Finnan haddock), and Wick, where the herring curing is a trade of great magnitude. In Ireland the chief fisheries are at Kinsale, though there are smaller ones all round the west coast. Sugar is not an article of British growth, but sugar refining is very considerably carried on, whether it be cane-sugar from the West Indies or the Mauritius, or beet-root sugar

from France and Germany. The chief sugar refining establishments are in the Whitechapel district of the east end of London, Bristol, Liverpool, Glasgow and Greenock, and over 5000 people are employed in this trade. Tobacco, if not a food, is looked upon and used by a good many people as such, if we are to judge by the returns of consumption, which show that a great deal more tobacco is smoked than can possibly be good for us. We grow no tobacco in this country, but import it from the United States, Mexico, Holland, and the Phillipine Islands. The preparation of tobacco is a considerable industry in Great Britain, most of our large towns possessing tobacco factories, but chiefly, London, Bristol and Liverpool in England, Glasgow in Scotland, and Dublin and Belfast in Ireland.

Provision preserving, in the way of tinned meats and vegetables, has of late years become a very large trade, and particularly in London, Aberdeen and Leith. Preserved milk is manufactured at Aylesbury, and biscuits are turned out by the million at the Government Victualling Department at Deptford, and at the great factories at Reading and Carlisle.

RAILWAYS AND SHIPPING PORTS.

HAVING briefly detailed the principal industries which characterise Great Britain, it will not be amiss to glance at the various means by which the materials for the industries and their results, are transported here and there—for not only are our railways, canals and shipping actually necessary in themselves for the development of the industries, but they are the sources of employment for gigantic amounts of capital and very large bodies of persons. A country which has no water-ways or railways cannot possibly have much trade, and when we find a kingdom like England intersected by a complicated network of communications, it shows what a vast amount of commerce and manufacturing activity is dependent upon it. The length of the railway lines in England, Scotland and Ireland is, in round numbers, about 18,000 miles, representing the enormous capital of £675,000,000 sterling. The ceaseless personal intercourse is shown by the fact that over 560,000,000 of passengers are conveyed by the railways each year, a number which, of course, increases by the opening up of fresh routes, and the greater facilities which are offered for travelling every year. The total amount of traffic receipts is nearly £62,000,000 sterling, about half of which has to be deducted for working expenses, leaving the remainder to pay interest on the money which the shareholders have invested in the railways. Not a single line in this country is owned by the State, as is so much the case in Continental countries, but every single one has been made and is worked

by bodies of shareholders united into great companies; and although there is scarcely a town in Great Britain which is not served by a railway (or perhaps more than one), yet nearly the whole of our railway system is parcelled out amongst a few great companies. The Great Western Railway gives accommodation to the country between London and the west of England. Its main line runs from Paddington to Reading, Bath and Bristol, from whence the system is extended to Taunton, Exeter, Plymouth and Penzance. At Didcot an important division takes place northward to Oxford, radiating in one direction to Leamington, Birmingham, Shrewsbury, Liverpool, Manchester, and the west coast of Wales—in another direction to Worcester, Hereford, and the iron districts of South Wales. At Swindon a second great division takes place to Stroud, Gloucester, and the large manufacturing towns on the south coast of Wales, such as Newport, Cardiff, Swansea and Milford Haven, forming one of the great traffic arteries to Waterford and the south of Ireland. Of course, where so large a district is served as between Manchester and Penzance, there must be every variety of traffic, but if one more especial than others could be named, it should be that of coal, which is carried in great quantities from the coal basins of South and North Wales, Shropshire, Somersetshire and the Forest of Dean. The Great Western is also a large carrier of provisions—fish from the south coast, vegetables from Cornwall, butter and cured provisions from Ireland. The London and North-Western Company is at once the largest railway corporation in England,

owning most capital, possessing the greatest length of railway system, and tapping nearly all the most important centres. Starting from Euston Square, it runs diagonally to the very northern limits of England, *viâ* Rugby, Birmingham and the Black Country, Stafford and Crewe, where three most important deviations take place—(1) to Chester, North Wales and Holyhead, the route by which the Irish mails are conveyed; (2) to Warrington, Wigan, Preston, Lancaster and Carlisle, the main route from England to Scotland; (3) to Manchester, Liverpool, Bolton, Ashton, and the cotton districts generally. Branch lines are perpetually given off to the different manufacturing and commercial towns, many of which have the good fortune to be served by at least three or four companies, all anxious to attract the passenger or the goods traffic. As to the character of the London and North-Western traffic, it is typical of the industries and produce of the whole of England. Vast quantities of coal are brought to London from the collieries of South Wales (in which this company is a great competitor with the Great Western), Warwickshire, Lancashire and Staffordshire. Iron and tinplate in all their bewildering varieties of manufacture are carried from South Wales and Staffordshire to London and Liverpool, while there is a perpetual traffic of iron-ore from Northamptonshire and other mineral localities to the different works in Wales, Staffordshire, or the North of England. The great towns of the North have also ceaseless interchanges in their traffic of iron and steel manufactures, and still more in the cotton districts, of raw cotton from America, and

manufactured textiles from Lancashire and Yorkshire. More than one half of the gigantic provision trade of London and our busy manufacturing towns could not be carried on without the aid of this vast railway system, which brings American produce, Irish provisions, fish from the west coast, and meat, alive and dead, from the Scotch Highlands.

The next great railway corporation is that of the Midland Railway, whose system starts from St Pancras and takes the lion's share of the hosiery districts, together with a good portion of the clothing district. The main line runs to Bedford, Derby, Leicester, Chesterfield, Leeds, Bradford, Skipton and Carlisle; but, like the other big companies, it has numerous branches starting out right and left. The Midland is a large coal and beer carrier to London, the latter from Burton-on-Trent, the former from the Nottinghamshire, Derbyshire and South Yorkshire collieries. It also provides main routes from the South to Liverpool and Scotland. The Great Northern (King's Cross) connects the metropolis with Yorkshire and the East Coast of Scotland; but although a very important system, does not run through such dense centres of industrial population as the two last named lines. It passes through the agricultural towns of Huntingdon, Grantham, and Retford, and then enters the coal and clothing districts of Yorkshire, near Sheffield, having its terminus at Bradford. The Great Eastern Railway has much less manufacturing advantages, to which may be attributed its slow progress, and its repeated difficulties. Quitting London at Liverpool Street, it accommodates the whole of Mid-

eastern England between Essex and Lincolnshire. It has two principal lines to Norwich and Yarmouth by different routes, and innumerable branches to the various eastern counties and towns. The lines south of London are of a different stamp to the northern lines, passing through completely different types of country; but they have one principal advantage, of being the carriers of both passenger and goods for the Continental traffic. The South-Eastern and the London, Chatham and Dover do the majority of this trade as far as passengers are concerned, while for heavy traffic the London and South-Western offers most facilities, from tapping so many ports like Southampton, Poole and Weymouth. The London, Brighton and South Coast provides facilities for Sussex and the Isle of Wight, but is more characterised by its pleasure traffic than any of the other lines. In the North of England, the two great companies are the North-Eastern, and the Lancashire and Yorkshire, the former having the monopoly of the East and North Ridings of Yorkshire, Durham and Northumberland, and providing, in conjunction with the Great Northern and Midland, a through route to Scotland. The head quarters of this Company are at York, and its chief producing sources, Leeds, Hull, Sunderland, Newcastle and Carlisle.

The Lancashire and Yorkshire Company is limited, as its name implies, to these two counties, but the number of industrial towns and villages which it serves is so great that it possesses a very complicated network of traffic, dealing largely with coal and iron, but principally with the cotton and woollen trades.

Amongst the smaller railway systems which are not yet quite absorbed by the larger ones, although probably such will be their ultimate fate, is the Manchester, Sheffield and Lincolnshire, which connects Hull with Sheffield, Manchester and Liverpool. One specialty of this railway company is the carrying of produce from Holland and the North Sea fisheries. The Furness Railway has a not very extensive, but a valuable and active traffic amidst the hematite iron ore mines and the furnaces in the neighbourhood of Ulverston and Barrow. The Cheshire lines carry the produce of the salt districts to the shipping ports, and also constitute links in the through traffic to Liverpool—for there is this peculiarity in the arrangements of British railways, that an uninterrupted route is provided both for passengers and goods, whether the same line upon which they started goes to their destination or not. The North Staffordshire Railway also answers a local purpose, and maintains a busy circulation between Crewe and Derby, passing through the large pottery towns of Stoke, Burslem, etc. Its chief carrying trade is in coal and iron from and to the various North Staffordshire works, together with china-clay, flints, and other materials for the pottery industry. The iron, coal, copper and tinplate trades of South Wales are accommodated by several lines, such as the Monmouthshire, Taff Vale, Brecon and Merthyr, Caermarthenshire, etc., running to the various ports of Newport, Cardiff, Swansea and Llanelly; but they are only locally important, and will probably disappear in time altogether, swallowed up by the big companies, who are always on the look-out to secure

a new industrial field, or a new shipping port. The Cambrian and Mid-Wales lines accommodate the agricultural districts of the Principality. The following are the principal shipping outlets of the English lines :—

<i>London & North-Western</i>	{	Liverpool, Cardiff, Newport, Swansea and Holyhead.
<i>Great Western</i>	{	Bristol, Gloucester, Weymouth, Birkenhead, Plymouth, Cardiff, Newport, Swansea and Milford.
<i>Midland</i>	{	Liverpool, Gloucester, Bristol, Swansea and Lynn.
<i>Great Eastern</i>	{	Harwich, Ipswich, Yarmouth and Lynn.
<i>Great Northern</i>	{	Liverpool and Grimsby.
<i>South-Eastern</i>	{	Dover, Ramsgate and Strood.
<i>London, Chatham and Dover</i>	{	Dover, Ramsgate and Strood.
<i>London, Brighton and South Coast</i>	{	Newhaven, Shoreham, Littlehampton and Portsmouth.
<i>London & South-Western</i>	{	Southampton, Poole, Weymouth, Portsmouth, Plymouth and Bideford.
<i>North-Eastern</i>	{	Newcastle, Hull, Sunderland, Middlesbrough and Hartlepool.
<i>Lancashire and Yorkshire</i>	{	Liverpool, Preston and Fleetwood.
<i>Furness</i>	{	Whitehaven and Barrow.

The Scotch railways are equally apportioned amongst a few great companies, each of which has leagued itself with a corresponding English company, so as to offer the advantages of several through routes. The two largest companies in Scotland are the Caledonian and North British, the former occupying the country between Carlisle, Edinburgh, Glasgow and Perth, and providing

great facilities for the enormous iron and coal traffic of the Lanarkshire basin, and the shipping trade of Glasgow, Greenock, and the textile industrial towns in their neighbourhood. The North British Railway clings more to the Eastern coast, taking its rise at Berwick and also at Carlisle, and approaching Edinburgh by two distinct routes. From thence it spreads northward, crossing the Firths of Forth and Tay by very long bridges, and accommodating the linen districts of Fifeshire and Forfarshire, ending its course at Aberdeen. The Glasgow and South-Western serves the Western coast between Carlisle and Glasgow, and supplies Dumfriesshire, the coal and iron districts of Ayrshire, and the weaving towns of Kilmarnock, Paisley, etc., with the necessary railway facilities. The northern half of Scotland is divided between two companies, the Great North of Scotland and the Highland, both of them, but more especially the latter, extending for long distances, with but few centres of population and still fewer industrial centres. The former line commences at Aberdeen, and works round the coast of Elgin, and through Banffshire to Inverness, besides supplying Deeside and the interior of Aberdeenshire as well. The Highland line is well-named, for it penetrates through the loftiest ranges in Scotland, and thus maintains a direct communication between Perth and Inverness, continuing its course northward to the very extremity of the kingdom at Wick and Thurso, and also furnishing a branch through Ross-shire to the Isle of Skye.

The Irish railways are in some points different from both English and Scotch, owing to the fact that, beyond

the province of Ulster, there are so few industrial towns in Ireland, and, moreover, no mineral traffic, which is the mainstay of most railways. The principal lines are the Great Northern of Ireland, which is the busiest of all, connecting Dublin with Drogheda, Dundalk, Armagh, Belfast and the north of Ireland, and thus possessing, in connection with the Belfast and County Down Railway, all the traffic of the linen districts. The Midland Great-Western bisects the middle of Ireland, from Dublin to Mullingar, Athlone and Galway, with branches to Sligo, Ennis, and a few other places. The Dublin, Wicklow and Wexford runs between these towns, and is sufficient for the limited traffic of the South-east coast ; and the same may be said of the Waterford and Limerick, and the few lines in the south. The Great Southern and Western is an important main line, connecting Dublin with Kilkenny, Cork, Killarney and Tralee. The numbers of those employed in our railway system form a large and important body, comprising, amongst the officials, station-masters, clerks, engine-drivers and stokers, and railway men generally, some 104,000 persons.

The Canal system, though of great importance to the trade of the country, has been largely shorn of its utility since the spread of the railway system—and unnecessarily so, as too much has been sacrificed to speed, overlooking the equally sure and far less costly carriage by water. Indeed, our canals have been very foolishly neglected, though there is a tendency to bring them more into play than they have been, and thus reduce the cost of carriage by rail. A great many of

our canals are comparatively deserted, two or three barges being the usual complement of traffic, while on others, such as the Bridgewater canal, and especially that section of it which runs between Runcorn and the Potteries, the traffic is unceasing. One reason of this regrettable waste of water-way is, that the great Railway companies have, in many cases, bought up the canals. They follow the same directions as the railways, and are principally used in carrying very bulky traffic, so as to relieve the congested portions of the lines.

Having now examined how the inland traffic of our industries is provided for, let us also glance at our ports, from whence proceed those never-ending processions of ships and steamers, carrying England's commerce and her goods to every known quarter of the globe. First and foremost, of course, is London, the centre of all English maritime trade, in whose gigantic docks and warehouses are housed the products of all the world. Following the course of the Thames, we find Gravesend, which derives its importance as a sort of doorway to the port of London, where outward-bound ships take in their last passengers. The east coast of England is deficient in ports, and still more in harbours, which might furnish refuge for vessels in time of danger, along an extensive stretch of iron-bound rocks. The following list of ports, with their specialities, deals with them in their order of locality, proceeding northward and all round the kingdom :—

Harwich, at mouth of the Stour (Essex)—Great Eastern Railway Company's port for Continental traffic *viâ* Antwerp and Rotterdam.

Ipswich, on the Orwell (Suffolk)—General trade.

Great Yarmouth, mouth of the Yare (Norfolk)—Herring fishing.

Lynn, on the Wash (Norfolk)—Midland and Great Eastern Railway port; timber trade.

Grimsby (Lincolnshire)—North Sea fishing; Great Northern Railway port.

Hull, on the Humber (Yorkshire)—Whale fishing; North Sea fishing; Russian, Norwegian, Swedish, Danish and Dutch trade; timber; wheat; linseed; tallow; hemp.

Filey (Yorkshire)—Proposed harbour of refuge.

Whitby, mouth of the Esk (Yorkshire)—Fishery; ship-building.

Middlesbrough, mouth of the Tees (Yorkshire)—Shipping of iron and machinery.

The Hartlepools (Durham)—Importation of timber; general trade.

Seaham (Durham)—Shipping of coal.

Sunderland, mouth of the Wear (Durham)—Shipping of coal.

South and North Shields, mouth of the Tyne—General trade; coal shipping.

Newcastle-on-Tyne (Northumberland)—Shipping of coal, iron, glass, chemicals.

Blyth (Northumberland)—Coal shipping.

Berwick, mouth of Tweed (Berwickshire)—General trade; salmon fishing.

Dunbar (Haddingtonshire)—Fishing.

Leith (Edinburghshire)—Russian trade; provision trade.

Granton, on the Forth (Edinburghshire)—Railway ferry harbour.

Grangemouth, mouth of the Carron (Stirlingshire)—Iron shipping.

Kirkcaldy (Fifeshire)—General shipping.

Dundee, on the Tay (Forfarshire)—Hemp, jute and flax imports.

Arbroath (Forfarshire)—Hemp and jute shipping.

Montrose (Forfarshire)—Linen and general shipping.

Aberdeen, mouth of Dee (Aberdeenshire)—Norwegian and Danish trade; whale fishing; granite shipping.

Peterhead (Aberdeenshire)—Whale and North Sea cod fishing; granite shipping.

Fraserburgh (Aberdeenshire)—Fishing; ship building.

Banff (Banffshire)—Herring fishing.

Wick (Caithness)—Herring fishing.

Thurso, mouth of the Thurso (Caithness)—Stone and pavement shipping.

Greenock (Renfrewshire)—West Indian sugar trade.

Glasgow, on the Clyde (Lanarkshire)—American and West Indian trade; shipping of cotton and iron.

Ardrossan (Ayrshire)—Coal and iron shipping.

Troon (Ayrshire)—Coal shipping for Ireland.

Portpatrick (Wigtownshire)—Steamer route for Ireland.

Stranraer (Wigtownshire)—General shipping.

Maryport (Cumberland)—Coal shipping.

Workington (Cumberland)—Coal shipping.

Whitehaven (Cumberland)—Coal and iron-ore shipping.

Barrow (Lancashire)—Iron and iron-ore shipping.
(Midland route to Ireland.)

Ulverston (Lancashire)—Iron-ore shipping.

Morecambe (Lancashire)—Midland route to London-derry.

Lancaster, on the Lune (Lancashire)—General shipping.

Fleetwood (Lancashire)—Timber shipping ; Irish trade.

Preston, on the Ribble (Lancashire)—General shipping.

Liverpool, on the Mersey (Lancashire)—American passenger traffic ; American provision trade ; American cotton trade ; American and Canadian timber trade ; American grain trade ; Irish provision trade ; emigration port.

Runcorn, on the Mersey (Cheshire)—Salt shipping ; china clay import.

Birkenhead, on the Mersey (Cheshire)—American and general shipping.

Mostyn (Flintshire)—Coal shipping.

Bangor, on Menai Straits (Carnarvonshire)—Slate shipping.

Amlwch (Anglesea)—Copper-ore shipping.

Holyhead (Anglesea)—Mail steamer route to Kingstown, and London and North-Western steamers to Greenore for the north of Ireland.

Pwllheli (Caernarvonshire)—General shipping.

Portmadoc (Caernarvonshire)—Slate shipping.

Aberdovey, mouth of the Dovey (Merionethshire)—Slate shipping.

Cardigan, mouth of the Teify (Cardiganshire)—General shipping.

Milford, on Milford Haven (Pembrokeshire)—General shipping ; Great Western route to south of Ireland.

Pater (Pembrokeshire)—Government shipyard.

- Llanelli*, mouth of the Burry (Caermarthenshire)—Copper-ore shipping; anthracite coal shipping.
- Swansea*, mouth of the Tawe (Glamorganshire)—Coal and iron shipping; copper-ore importation.
- Neath*, mouth of the Neath (Glamorganshire)—Copper, coal and iron shipping.
- Aberafon*, mouth of the Avon (Glamorganshire)—Copper-ore shipping.
- Porthcawl* (Glamorganshire)—General shipping; coasting trade.
- Penarth*, mouth of the Taff (Glamorganshire)—Coal and iron shipping.
- Cardiff*, mouth of the Taff (Glamorganshire)—Coal and iron shipping; American trade.
- Newport*, mouth of the Usk (Monmouthshire)—Coal, iron and tin-plate shipping.
- Lydney* (Gloucestershire)—Iron, coal and tin-plate shipping for the Forest of Dean.
- Bullo*, on the Severn (Gloucestershire)—Coal shipping. (Forest of Dean.)
- Gloucester*, mouth of the Severn (Gloucestershire)—Grain and malt shipping; general trade.
- Sharpness*, Severn Estuary.—Corn and general shipping (mouth of the Gloucester Ship Canal).
- Bristol*, on the Avon (Gloucestershire)—West Indian trade; coal and iron shipping; Irish trade.
- Highbridge*, mouth of the Brue (Somersetshire)—Coal and general shipping.
- Bridgewater*, mouth of the Parret (Somersetshire)—Coasting trade.
- Watchet* (Somersetshire)—Iron-ore shipping from Brendon hills for Wales.

Barnstaple, mouth of the Tawe (Devonshire)—Coasting trade.

Bideford, mouth of the Torridge (Devonshire)—General shipping.

Padstow (Cornwall)—Coal and general shipping.

New Quay (Cornwall)—Iron and copper-ore shipping.

Portreath (Cornwall)—Iron-ore and coal shipping.

St Ives (Cornwall)—Fishery.

Falmouth, mouth of the Fal (Cornwall)—Mail packet station ; general shipping ; granite shipping.

St Austell (Cornwall)—China-clay shipping.

Fowey (Cornwall)—Iron-ore shipping.

Par (Cornwall)—Iron, tin and copper-ore shipping.

Looe (Cornwall)—Granite shipping.

Plymouth (Devonshire)—Naval station ; granite shipping ; general trade.

Brixham (Devonshire)—Fishing.

Bridport (Dorsetshire)—General shipping.

Portland (Dorsetshire)—Harbour of refuge.

Weymouth (Dorsetshire)—French trade ; Great Western route to the Channel Islands and Cherbourg.

Poole (Dorsetshire)—China-clay and general shipping.

Lymington, on the Solent (Hampshire)—Coasting trade.

Cowes (Isle of Wight)—Yacht station.

Southampton, on Southampton water (Hampshire)—South American trade and Cape.

Portsmouth (Hampshire)—Naval station.

Little Hampton, mouth of the Arun (Sussex)—London, Brighton and South Coast route to Harfleur.

Shoreham, mouth of the Adur (Sussex)—Coal and general shipping.

Newhaven, mouth of the Ouse (Sussex)—London, Brighton and South Coast route to Dieppe.

Rye (Sussex)—General shipping.

Folkestone (Kent)—South Eastern Company's route to Boulogne ; French trade.

Dover (Kent)—Mail route to Calais and Ostend.

Deal (Kent)—Opposite the Downs, the halting place for all ships waiting for pilots or fair winds.

Sandwich (Kent)—General shipping.

Ramsgate (Kent)—General shipping.

Margate (Kent)—General shipping.

Whitstable (Kent)—Oyster fishing.

Sheerness, Sheppy Island (Kent)—Naval Station.

Queenborough (Kent)—London, Chatham and Dover route to Flushing and Holland.

Strood, on the Medway (Kent)—General shipping.

Chatham, on the Medway (Kent)—Naval dock-yard and station.

IRELAND

Dublin, mouth of the Liffey (Dublin)—Timber and porter shipping ; provision and general trade.

Drogheda (Louth)—Provision trade with Liverpool and Bristol.

Dundalk (Louth)—General trade.

Carlingford (Louth)—Oyster fishing.

Greenore (Down)—Packet station for London and North-Western Railway.

Newry (Down)—General shipping.

Donaghadee (Down)—Channel steamer harbour (from Portpatrick).

Belfast, mouth of the Lagan (Antrim)—Flax imports ; English trade.

Larne (Antrim)—General shipping.

Londonderry (Derry)—General shipping.

Moville (Derry)—Port of call for American steamers.

Sligo (Sligo)—General shipping ; Bristol trade.

Westport (Mayo)—General shipping.

Galway (Galway)—General shipping.

Limerick (Limerick)—General shipping ; provision trade.

Tralee (Kerry)—General shipping.

Kinsale (Cork)—Fishing.

Cork (Cork)—Provision trade with England.

Queenstown (Cork)—Port of call for Atlantic steamers.

Youghal (Cork)—General shipping and coasting trade.

Dungarvan (Waterford)—General shipping and provision trade.

Waterford (Waterford)—General shipping ; Great Western route *viâ* Milford.

Wexford (Wexford)—General shipping.

Kingstown (Dublin)—Mail steamer station *viâ* Holyhead.

The number of vessels registered as belonging to the United Kingdom, which are the necessary factors in the trade of all these ports, was, in 1879, 19,945 sailing vessels, and 5,104 steamers, making a total of 24,959 vessels, of the tonnage of 6,521,289 tons. A remarkable point should be noticed in connection with this subject ; viz., the tendency to do away with sailing vessels, and supersede them by steamers, as shown by the fact that, in 1863, we possessed 26,339 sailing

vessels, and only 2,298 steamers, whereas, in 1877, the steamers had more than doubled, and the sailing vessels fallen off by more than 6,000. It shows how necessary it is to commerce that the highest organisation and the greatest speed to be obtained, consistent with due economy, should be constantly kept up; and we shall surely find that as the older sailing vessels, built of wood, become disqualified from age, their places will be still further taken by steam. Certain classes of goods are now-a-days no more carried by a slow sailing vessel, than passengers would consent to be carried by a stage-coach, and as fresh trade routes, such as the Suez Canal, are opened up, the competition of other countries makes it incumbent upon us to put forth all our strength to keep England as mistress of the seas. The tonnage here spoken of does not, of course, represent the trade of all these ports, but only takes account of British ships. The tonnage of ships, sailing and steam, both British and Foreign, which entered into and cleared from British ports with cargoes or in ballast, was as follows:—

	BRITISH	FOREIGN	TOTAL
1863...	17,019,392	9,719,341	26,738,733 tons
1880...	41,348,984	17,387,079	58,736,063 "

which shows that within the last seventeen years the tonnage of the British ships trading to our ports has more than doubled, and that of the foreign ships very nearly so. The number of men employed in our mercantile marine (exclusive of masters) was 193,548.

Let us now briefly examine what are the chief exports of our industries, which produce such a continuous

influx and efflux of vessels. We import no coal, but we send away vast quantities to all parts of the world, except America. France, Germany, Russia and Egypt are our chief customers ; France also takes patent fuel (a kind of compressed coal), shales and paraffins, while Spain and Sweden buy coke from us. Our chief foreign coal shipping ports are Newcastle, Hartlepool, Liverpool, Newport, Cardiff and Swansea. Neither do we export iron ore, but on the contrary, import a good deal from Spain, Algeria, Portugal, Italy, Norway and Greece. Tin ore is imported from the Straits Settlements and Australia ; copper ore from Spain, Cuba, Chili, Australia and North America, the shipping port being Swansea ; lead ore from Italy, while we send large quantities to Russia and China. Of iron we do not import much, except from Belgium and Holland (though these imports have been increasing of late years), but we export vast quantities. Russia takes largely of rails, wheels, axles, bar and old iron. Holland and Germany take pig, sheets, plates, tiles and pipes ; Italy takes bars ; India, angle iron, rails and hoops ; Australia, galvanised iron, nails and wire ; Sweden and Norway, anchors and chains, and America, tin-plates. These, of course, are the leading characteristics of the iron which each country wants most. The principal shipments are at London, Liverpool, Hull, Glasgow, Bristol and the South Welsh ports. Russia is our best customer for manufactured steel. Of manufactured copper, Germany, France and Holland take copper ingots ; the Straits Settlements, copper coin ; and India and Italy, the particular kind used for ship-sheathing, known as yellow metal. The bulk of our brass exports go to

Germany and Holland; and our hardwares as follows:—cutlery to Australia, Brazil, Germany, West Indies and South Africa; buttons to Germany, France and Holland; (fire-arms) China, (cannon) West Africa, (muskets) South Africa, (rifles) Germany, (revolvers) Australia. Machinery and engineering plant varies very much both as to the kind of exports and the place; but it will be found that it always bears a relation to the character of the country and its development. Thus, steam ploughs and portable engines are now being sent largely to South Russia, Austria, Hungary and Germany; sugar crushing machinery to the West Indies and Mauritius; cotton cleaning machinery to India and Egypt; quartz-crushing machinery for gold mining to the Australian colonies, etc.

Turning to another branch of trade, we find that the United States, Germany, Holland and Russia take large quantities of chemicals from us, and particularly alkalies. The West Indies, South Africa, Java, China and Spain take our soap and candles, while, on the other hand, Russia supplies us with tallow and stearine. Even our lucifer matches are exported to the amount of nearly £200,000 per annum, of which Australia takes about one-half. In the article of pottery, the United States are our best customers, and Germany for brown ware, but the foreign manufacture is so greatly improved of late years, that our customers have a good deal fallen off. We send the majority of our glass (including looking glasses) to the United States and Australia, which latter country takes the largest share of glass bottles. On the other hand, we import a

good deal of the better kinds of plate glass from Belgium.

We must not omit to notice the paper trade, as, although we make vast quantities of paper for our own consumption, principally in the counties of Kent, Surrey, Hertford, and the home counties generally, we also import a considerable amount of writing and printing paper from Belgium and Sweden, together with very large quantities of linen and cotton rags, and of the fibre of the Esparto grass, which grows in Spain and Algeria, and without which our paper trade would come very badly off; and the imports of this are annually increasing. Newcastle and Cardiff are the chief ports to which the Esparto is brought. Sweden and Norway, too, furnish us with a quantity of wood pulp, now very much used for paper making. Our exports of paper are principally to Australia and India. The enormous magnitude of our own paper trade may be partially gathered from the fact, that nearly one thousand million letters annually pass through the Post-office, and that last year there were 1885 different newspapers, and 818 different periodicals published, daily, weekly or monthly.

Our textiles form the great majority of our imports and exports, and keep whole fleets employed in the carriage of this merchandise. In the cotton trade upwards of fifty million pounds sterling are spent in getting the raw cotton from America, India, Egypt, Brazil, and other countries, while we also import considerable quantities of cotton yarn from Germany and Holland, and cotton waste from Belgium and France. Our exports go all over the world, and it is

hard indeed to name a country where British cotton goods are not found. Germany and Holland are the best customers for cotton yarns, India and China for plain piece goods, Turkey and Brazil for coloured piece goods, and Australia for mixed goods. In the linen trade, Russia supplies us with rough or undressed flax and tow, and Belgium with dressed flax, for which some of the Belgian towns, like Courtrai, have a great name. Our linen productions have a somewhat different destination to that of the cotton, the yarn going to Spain and the Canaries, the unbleached linen goods to the United States, the West Indies and North America, and the printed linens and diapers to France and America. The jute trade is fed with the raw material from India and Burmah, while Germany, America and Sweden take the majority of the jute goods and sailcloth. Our woollen trade is very largely furnished with the raw material from our own sheep; but there are many varieties of wool which we cannot obtain at home, and are therefore obliged to seek them abroad. Alpaca and Llama wools come from South America, while Australia sends us vast quantities of wool from the countless flocks that graze on the plains of New South Wales, Victoria and Queensland. Australia takes back a good many of our blankets and flannels, and the United States and Germany buy our broadcloth and coatings. In our silk trade, we are rather importers than exporters, having no raw silk of our own, so that we have to get it from China, Japan, France and Italy. We also obtain silk stuffs and velvets from France and Belgium. Our leather trade gives occasion for a great deal of commerce, and

particularly in the imports, for in addition to the large quantities of tanning materials, such as oak-bark, valonia, shumach, etc., we obtain hides from India, Holland, South Africa, Uruguay, Brazil and the Argentine Confederation, and tanned hides from Australia. The imports of fibres for ropes and cordage are very large in the shape of hemp from Germany, Italy and the Philippine Islands; as also of india-rubber and gutta-percha from Brazil, Africa and the Straits Settlements.

SYNOPTICAL TABLE OF INDUSTRIES.

[The names of those towns only are given which have some special industries. The populations are those of the Census of 1881.]

ENGLAND.

BEDFORDSHIRE (149,461)—Agriculture; lace, and straw plait.

Bedford (19,532)—Agricultural machinery; pillow lace; straw plait.

Dunstable (4,627)—Straw plait.

Luton (23,959)—Straw plait; hat and bonnet making.

BERKSHIRE (218,382)—Agriculture; sheep farming.

Reading (32,050)—Biscuit making; iron works; seed growing; rifle making.

BUCKINGHAMSHIRE (176,277)—Agriculture ; pillow lace.

Aylesbury (7,795)—Preserved milk and butter making ; poultry breeding ; silk weaving ; straw plait.

Chesham (6,853)—Butter-print making ; brush making.

Newport Pagnel (3,686)—Brewing.

Slough (4,529)—Brickfields.

Wolverton—Railway works.

Wycombe (10,618)—Chair making ; paper and lace making.

CAMBRIDGESHIRE (185,475)—Agriculture ; coprolites.

Newmarket (5,160)—Horse training.

Waterbeach—Coprolite digging and grinding for manure.

CHESHIRE (643,237)—Dairy-farming ; salt ; silk.

Altrincham (11,249)—Vegetable growing ; linen weaving.

Birkenhead (83,324)—Docks ; ship building ; engineering.

Bollington (3,962)—Cotton spinning.

Chester (36,788)—Ship building ; lead smelting.

Congleton (11,116)—Silk and cotton spinning ; millstone grit quarrying.

Crewe (24,372)—Railway works ; iron and steel making.

Hyde (28,629)—Cotton spinning.

Lymm (4,665)—Fustian cutting.

Macclesfield (37,514)—Silk and cotton spinning ; velvet making.

Middlewich (2,379)—Salt making.

Nantwich (7,488)—Boot and shoe making.

- Northwich* (12,246)—Salt mining and making; ship building.
- Parkgate* (3,289)—Coal mining.
- Runcorn* (19,202)—Shipping for Staffordshire potteries and Cheshire salt.
- Stalybridge* (22,784)—Cotton spinning.
- Stockport* (59,444)—Cotton spinning; hat making.
- Widnes* (24,919)—Chemical and alkali works.
- Winsford* (10,041)—Salt making.
- CORNWALL (329,484)—Tin, copper and iron; granite; china clay; early vegetables.
- Bodmin* (5,061)—Wool spinning; boot and shoe making.
- Botallack*—Tin and copper mining.
- Callington* (7,678)—Tin and copper mining.
- Falmouth* (4,373)—Shipping port; ship building; fishing.
- Hayle* (1,089)—Engineering.
- Liskeard* (4,479)—Granite quarrying; mining.
- Lizard*—Serpentine quarrying.
- Looe* (5,661)—Granite shipping.
- Lostwithiel*—Iron-ore mining.
- Mevagissey* (4,227)—Pilchard fishing.
- Newquay* (1,589)—Iron-ore shipping.
- Padstow* (6,120)—Shipping port.
- Par*—Iron-ore and china-clay shipping; tin smelting.
- Penzance* (11,684)—Fisheries; early vegetables; mining.
- Redruth* (9,335)—Tin and copper mining.
- St. Austell* (3,612)—China clay digging and shipping.

St. Ives (6,441)—Fisheries.

Tintagel—Slate quarrying.

Truro (10,663)—Tin, copper and iron mining and shipping.

CUMBERLAND (250,630)—Agriculture ; coal ; hematite iron ore.

Alston (4,621)—Lead mining and smelting.

Carlisle (35,866)—Cotton spinning ; hat making ; biscuit making.

Cleator (10,420)—Iron mining and smelting.

Egremont (5,976)—Iron mining.

Keswick (3,219)—Copper mining ; lead-pencil making.

Millom (6,231)—Iron and steel making.

Maryport (8,177)—Coal shipping.

Whitehaven (19,321)—Coal and iron-ore shipping.

Workington (13,305)—Coal shipping.

DERBYSHIRE (461,141)—Iron ; coal ; lead ; silk ; hosiery.

Alfreton (4,492)—Coal mining ; pottery.

Ambergate—Limestone burning.

Belper (9,875)—Hosiery and silk trades ; nail making.

Buxton (6,021)—Limestone quarrying ; mineral springs.

Castleton—Lead mining.

Chesterfield (12,221)—Coal mining ; iron working ; lace and silk weaving.

Clay Cross (1,870)—Coal working.

Cromford—Cotton spinning.

Derby (80,410)—Silk and hosiery weaving ; cheese making ; iron and engine works.

- Dronfield* (4,331)—Iron and steel works.
Glossop (19,574)—Cotton spinning and paper making.
Hathersage—Needle and fish tackle making.
Hayfield (12,736)—Dyeing and print works.
Ilkeston (14,119)—Coal and iron works; lace and hosiery weaving.
Matlock (11,930)—Lead mining and mineral springs.
Staveley—Coal and iron works.
Trent—Railway works.
Winster—Lead mining.
Wirksworth (3,678)—Lead mining.
- DEVONSHIRE (604,397)—Agriculture; copper; granite; lace.
- Axminster* (5,186)—Carpet making.
Barnstaple (12,283)—Fisheries; ship building; pottery; lace making.
Bideford (6,512)—Shipping and ship building.
Bovey Tracey—Lignite coal working.
Brixham (4,941)—Fisheries; rope making; ship building.
Colyton (6,497)—Pillow lace making.
Combemartin (3,235)—Lead mining.
Dartmoor—Granite quarrying.
Devonport (48,745)—Naval station; victualling.
Exeter (37,608)—Paper making.
Exmouth (8,275)—Lace making.
Honiton (3,349)—Pillow lace making.
Ivybridge (1,830)—Paper making.
Kingsbridge (4,289)—Malting.
Newton Abbot (14,233)—Tiles and pottery; railway works.

Ottery St. Mary (4,005)—Pillow lace making.
Plymouth (75,096)—Naval station and garrison;
limestone quarrying; ship building; sugar refin-
ing; artificial manure making.

South Molton (3,340)—Iron-ore mining.

Tavistock (13,440)—Lead and copper mining.

Tiverton (10,025)—Lace making; net making.

Torquay (32,946)—Pottery.

Torrington (5,172)—Glove making.

DORSETSHIRE (190,979)—Agriculture; china clay.

Bridport (6,790)—Flax and twine spinning; ship
building.

Poole (12,303)—Shipping port; clay digging;
agricultural machinery.

Portland (10,046)—Oolite quarrying.

Sherborne (5,717)—Glove making; silk weaving.

DURHAM (867,586)—Coal; iron; glass.

Bishop Auckland (10,087)—Coal mining.

Consett (7,162)—Iron works.

Darlington (35,102)—Collieries and iron works;
worsted making; waggon building.

Durham (14,932)—Collieries and iron works;
carpet and woollen trade; mustard making.

Gateshead (31,350)—Iron works; anchor and glass
making; chemical works.

Hartlepool (40,851)—Coal and iron works; ship-
ping; timber importing; engineering and ship
building.

Jarrow—Ship building; chemical works.

Port Clarence—Iron works.

Seaham—Coal shipping.

South Shields (56,932)—Coal shipping ; ship building.

Stanhope (1,840)—Lead mining.

Stockton-on-Tees (41,040)—Iron works ; sail-cloth and worsted making.

Sunderland (116,262)—Coal shipping ; glass ; sail-cloth and rope making ; ship building.

Weardale—Iron mining.

ESSEX (575,930)—Agriculture ; market gardening.

Bishop's Stortford (6,704)—Malting.

Braintree (7,253)—Silk weaving.

Brentwood (12,015)—Agricultural machinery ; malting.

Chelmsford (9,885)—Agricultural machinery.

Colchester (28,395)—Silk and cloth weaving ; oyster growing.

Earls Colne—Agricultural machinery.

Halstead (5,804)—Wool, silk, velvet, and straw-plait spinning.

Harwich (7,810)—Shipping port.

Maldon (5,476)—Shipping ; silk weaving ; agricultural machinery ; oyster growing.

Millwall—Iron works ; ship building ; chemical works.

Romford (6,861)—Brewing ; market gardening.

Silvertown—India-rubber works.

Stratford (38,489)—Railway works ; oil and grease works ; cork carpet making.

Waltham—Powder mills ; rose growing.

GLOUCESTERSHIRE (572,480)—Agriculture ; sheep farming ; quarrying ; cheese ; textiles.

- Bristol* (206,503)—Shipping port; brass wire, and white lead works; tanning and boot making; waggon building; sugar refining; soap boiling; tobacco making; coal mining.
- Cheltenham* (43,792)—Oolite quarrying; malting and brewing.
- Cinderford*—Coal and iron works.
- Cirencester* (7,703)—Corn market; cheese making.
- Coleford* (2,709)—Coal and iron works.
- Dursley* (5,291)—Woollen weaving.
- Forest of Dean*—Iron-ore mining; collieries; iron and tin-plate works.
- Gloucester* (36,552)—Shipping port; agricultural machinery; waggon building.
- Lydney*—Iron and tin-plate works; coal shipping.
- Moreton*—Linen weaving.
- Newent* (6,164)—Coal mining.
- Sharpness*—Shipping port.
- Stroud* (11,096)—Cloth weaving; elastic web and army clothing; pin making; umbrella making; brewing.
- Tewkesbury* (10,340)—Mustard making; nail and rope making.
- HAMPSHIRE (593,487)—Agriculture; sheep farming.
- Alton* (4,510)—Hop growing; brewing; paper making.
- Alum Bay (Isle of Wight)*—Sand digging for glass making.
- Andover* (6,884)—Malting; agricultural machinery.
- Basingstoke* (6,681)—Malting; agricultural machinery.
- Christchurch* (29,457)—Watch fusee making.

- Cowes* (6,487)—Yacht building.
Gosport (21,571)—Naval station; biscuit and victualling establishment.
Hayling Island—Oyster cultivation.
Laverstoke—Paper making for bank notes.
Liphook—Paper making.
Lymington (8,350)—Yacht building.
Newport, Isle of Wight (14,141)—Brush making.
Overton—Silk weaving.
Portsmouth (127,953)—Naval and military station; stay-making.
Romsey (6,527)—Flax dressing; paper making.
Southampton (60,325)—Shipping port; iron works; ship building; artificial manure and chemical works; engineering.
Whitchurch (5,458)—Silk weaving.
 HEREFORDSHIRE (121,042) — Agriculture; hops; cider.
Hereford (19,822)—Timber trade; hop growing.
Ledbury (8,646)—Cider making.
Leominster (6,626)—Glove making; tanning.
Lugwardine—Tile and pottery works.
 HERTFORDSHIRE (202,991)—Agriculture; malting.
Hemel Hempstead—Paper making; straw-plait making.
Hertford (7,585)—Malting and brewing.
Hitchin (8,434)—Corn market; straw-plait making.
Rickmansworth (6,162)—Paper making.
St. Albans (10,930)—Engineering; straw-plait making.
Tring (7,987)—Silk weaving.
Ware (5,726)—Malting and brewing.

Watford (15,506)—Malting ; paper making ; silk weaving.

HUNTINGDONSHIRE (59,614)—Agriculture ; vegetable growing.

KENT (977,585)—Agriculture ; hops ; fruit ; chalk ; bricks.

Ashford (9,693)—Railway works.

Burham—Chalk quarrying and lime burning.

Canterbury (21,701)—Woollen trade ; hop growing ; malting.

Chatham (26,358)—Naval station and garrison.

Dartford (10,567)—Paper making ; powder works.

Deptford (10,567)—Government biscuit making ; market gardening.

Dover (28,426)—Shipping port ; garrison.

Erith (9,723)—Iron works.

Faversham (8,756)—Brick making ; gun-cotton works ; oyster fisheries.

Folkestone (23,384)—Shipping port.

Gravesend (23,375)—Shipping port ; rope and sail making.

Greenwich (46,623)—Ship building ; engineering.

Maidstone (29,638)—Hop growing ; quarrying ; cherry brandy making ; paper mills.

Margate (18,085)—Brewing.

Northfleet (8,577)—Chalk quarrying.

Ramsgate (27,636)—Shipping port ; fisheries.

Rochester (21,593)—Agricultural machinery.

St. Mary Cray—Paper making.

Sevenoaks (6,288)—Hop growing ; brick making.

Sheerness (13,941)—Naval station.

- Sittingbourne* (7,884)—Brewing ; brick and paper making.
- Strood* (14,465)—Shipping port.
- Tonbridge* (9,340)—Wood work ; hop growing ; powder works.
- Whitstable* (6,269)—Oyster fisheries.
- Woolwich* (80,782)—Government arsenal and garrison.
- LANCASHIRE** (3,454,225)—Cotton trade and coal ; iron ore.
- Accrington* (31,435)—Cotton spinning ; machine making ; collieries.
- Ashton-under-Lyne* (37,027)—Cotton and woollen trade.
- Atherton* (12,602)—Cotton spinning ; collieries.
- Barrow-in-Furness* (47,111)—Shipping port ; iron and steel works ; jute spinning ; ship building ; chemical works.
- Bacup*—Cotton spinning.
- Blackburn* (104,012)—Cotton spinning ; collieries.
- Burnley* (58,882)—Cotton and woollen trade ; collieries.
- Bolton* (105,422)—Cotton trade ; machine making ; collieries ; engineering.
- Bury* (51,582)—Cotton spinning and machine making.
- Carnforth*—Iron and steel works.
- Chorley* (19,472)—Cotton spinning ; waggon building.
- Clitheroe* (10,177)—Cotton spinning ; limestone quarrying.
- Colne* (11,970)—Cotton spinning.

Coniston—Copper mining ; slate quarrying.

Darwen (29,747)—Cotton spinning ; dyeing and bleaching.

Fleetwood (6,513)—Shipping port.

Garston (10,131)—Coal shipping ; engineering.

Haslingden (14,333)—Cotton spinning ; stone quarrying.

Heywood (18,952)—Cotton spinning.

Kirkby Ireleth—Slate quarrying.

Kirkham (3,840)—Cotton spinning.

Lancaster (20,724)—Cotton spinning ; ship building ; oil-cloth making ; chemical works.

Leigh (21,733)—Cotton and silk spinning.

Liverpool (552,425)—Shipping port for cotton and provision trades ; rope and sail making ; foundries and engineering.

Manchester (341,508)—Cotton ; fustian ; silk and velvet trades ; engineering ; iron and steel ; locomotive and machinery works ; collieries.

Middleton (18,952)—Cotton spinning ; tapes and small wares.

Nelson (10,381)—Cotton spinning.

Newchurch-in-Rossendale (28,271)—Cotton spinning.

Oldham (111,343)—Cotton spinning ; fustian making ; hat and cap making ; machine making.

Ormskirk (6,651)—Ginger-bread making.

Padiham (8,983)—Cotton spinning.

Prescot (6,408)—Watch movement making ; coal mining.

Preston (96,532)—Cotton spinning ; ship building.

Ramsbottom—Cotton spinning.

Rochdale (68,865)—Flannel and cotton trades ; machine making.

St. Helens (57,234)—Copper smelting ; glass making ; collieries ; watch making.

Salford (176,233)—Cotton spinning ; iron works.

Todmorden (23,861)—Cotton and woollen spinning.

Ulverston (9,197)—Iron-ore mining and shipping.

Warrington (41,456)—Iron, steel, and engineering works ; glass making ; pin and nail making ; zinc and chemical works.

Wigan (48,196)—Cotton spinning ; iron and coal works.

LEICESTERSHIRE (321,018)—Agriculture ; hosiery ; coal ; granite.

Ashby-de-la-Zouch (4,536)—Coal mining ; hosiery trade ; pottery.

Bardon—Granite quarrying.

Hinckley (7,673)—Coarse hosiery ; boot and shoe making.

Leicester (122,351)—Hosiery and elastic web ; boot and shoe making ; woollen trade ; cheese making.

Loughborough (14,733)—Woollen hosiery and elastic web ; bell-founding ; engineering.

Lutterworth (13,356)—Hosiery.

Melton Mowbray (5,766)—Pork pie making.

Mount Sorel—Granite quarrying.

Whitwick (3,862)—Coal mining.

LINCOLNSHIRE (469,994)—Agriculture ; iron ; fisheries.

Boston (14,932)—Agricultural machinery ; seed crushing ; tobacco making.

Frodingham—Iron ore mining and smelting.

Gainsborough (10,964)—Agricultural machinery; ship building.

Grantham (16,886)—Malting; paper making; agricultural machinery.

Grimsby (29,682)—Shipping and ship building; fisheries; net making.

Lincoln (37,312)—Agricultural machinery; engineering.

Louth (10,690)—Carpet and woollen trades; agricultural machinery.

Sutton Bridge (2,160)—Shipping port.

MIDDLESEX (2,918,814).

London—

Bethnal Green—Silk and velvet weaving, trimming making.

Camden Town—Organ and pianoforte making.

Chiswick—Steam yacht building.

Clerkenwell—Jewellery and watch making.

Hackney—Boot and shoe making.

Hammersmith—Oil, lead and soap works.

Kentish Town—Organ and pianoforte building.

Pentonville—Jewellery and watch making.

Pimlico—Army clothing; engineering.

Spitalfields—Silk weaving.

Stepney—Army clothing.

Whitechapel—Sugar boiling and refining.

Acton—Laundry work.

Brentford (11,808)—River shipping port.

Enfield (19,119)—Government arms factory.

Hounslow—Powder works.

Staines (4,638)—Cork carpet and linoleum works

MONMOUTHSHIRE (211,374)—Agriculture; iron; steel; coal; tinplate.

Abercarne—Collieries; tinplate works.

Abergavenny (7,285)—Boot and shoe making; wire works.

Blanafon (9,452)—Iron and steel works; collieries.

Caerleon (1,099)—Tinplate works.

Chepstow (3,585)—Ship building; fisheries.

Crumlin—Collieries; engineering works.

Ebbwvale (15,519)—Iron and steel works; collieries.

Machen—Tinplate works; collieries.

Newport (35,382)—Shipping port; iron works; nail making; wire and nut and bolt works.

Pontypool (5,244)—Iron and steel works; tinplate works; collieries.

Rhymney (8,659)—Iron and steel works; collieries.

Tredegar (17,951)—Iron and steel works; collieries.

NORFOLK (444,825)—Agriculture; fisheries.

Downham Market (8,875)—Flax dressing.

East Dereham (8,601)—Boot and shoe making; malting; flour milling.

Fakenham (7,703)—Malting; flax dressing.

Lynn (18,475)—Shipping port; flax dressing; machine making; to-hack; seed crushing.

Norwich—g; boots; shoes; d silk wer; par

NORTHAMPTONSHIRE (272,524)—Agriculture; iron-ore; leather.

Banbury (12,072)—Agricultural machinery.

Blisworth—Iron-ore mining.

Kettering (11,093)—Iron-ore mining and smelting.

Northampton (51,880)—Leather dressing; boot and shoe making.

Peterborough (21,219)—Railway works; agricultural machinery.

Rushworth (7,838)—Iron-ore mining and smelting.

Wellingborough (13,796)—Iron-ore mining and smelting.

NORTHUMBRIA (434,024)—Sheep farming; coal; iron-ore; lead; glass.

Alnwick (2,741)—Coal mining; quarrying.

Berwick (1,111)—Fisheries; iron foundries.

Hexham (1,111)—Coal shipping.

Widdows—Engineering gun factory.

Widdows (1,111)—Leather making; tanning.

Widdows (1,111)—Cottons; linen weaving.

Widdows (1,111)—Engineering and iron works; ship building; chemical and glass works.

Widdows (1,111)—Coal shipping.

NORTHUMBRIA (434,024)—Agriculture; iron; coal; lace; ship building.

Alnwick (2,741)—Agricultural machinery.

Berwick (1,111)—Fisheries; quarrying; hosiery.

Hexham (1,111)—Linen and hosiery; iron.

Widdows

Widdows (1,111)—Lace and hosiery.

Widdows

Widdows (1,111)—Ship building.

- Tuxford* (4,306)—Agricultural machinery.
Worksop (11,628)—Coal mining.
- OXFORDSHIRE (179,650).
Witney (3,017)—Blanket making.
Woodstock (7,168)—Glove making.
- RUTLANDSHIRE (21,434)—Agriculture.
- SHROPSHIRE (247,993)—Agriculture; coal; iron; lead.
Bridgnorth (5,890)—Woollen trade; carpet making.
Broseley (4,458)—Tiles and tobacco pipe making.
Clee Hills—Basalt quarrying; coal mining.
Coalbrook Dale—Iron works; collieries.
Coalport—Pottery and china works.
Ironbridge—Coal mining.
Leebotwood—Coal mining.
Shelve—Lead mining.
Shrewsbury (26,478)—Flannel and linen weaving; agricultural machinery.
Wellington (6,202)—Iron and coal works.
- SOMERSETSHIRE (469,010) — Agriculture; dairy farming; coal.
Ashton—Iron works; coal mining.
Bath (51,790)—Oolite quarrying; cloth weaving; coach building; cabinet making.
Brendon Hills—Iron-ore mining.
Bridgewater (12,024) — Shipping port; brick making.
Chard (2,411)—Lace making; wool stapling.
Cheddar—Cheese making.
Crewkerne (8,149)—Glove making.
Frome (9,376)—Cloth; machinery; printing.

Glastonbury (10,509)—Glove making; boot and shoe making.

Highbridge—Shipping port.

Keynsham (4,869)—Brass works; lias-clay digging.

Mendip Hills—Iron-ore and lead mining.

Nailsea—Collieries; glass works.

Radstock (3,692)—Coal mining.

Shepton Mallet (5,322)—Timber trade; brewing.

Twerton—Cloth weaving.

Watchet—Iron-ore shipping.

Wellington (6,360)—Cloth weaving.

Wells (4,633)—Brush and paper making.

Yeovil (8,480)—Glove making.

STAFFORDSHIRE (981,385)—Iron; coal; hardware; pottery.

Bilston (22,730)—Iron works; japanned ware.

Brewood (5,770)—Lock making.

Burslem (26,521)—Pottery.

Burton-on-Trent (39,285)—Brewing.

Cannock Chase (17,127)—Collieries.

Churnet Valley—Limestone quarrying; iron-ore mining.

Cradley—Chain and anchor making.

Darlaston (13,574)—Iron works; nut and bolt works.

Etruria—Iron works; china and pottery works.

Hanley (48,354)—Iron works; collieries; pottery.

Leek (12,865)—Silk-thread spinning.

Longton (18,615)—Pottery and china works.

Newcastle-under-Lyne (17,506)—Pottery works; hat and cap making.

Sedgley—Collieries; horse-nail making.

- Spon Lane*—Lighthouse glass making.
- Stafford* (19,982)—Boot and shoe making; tanning.
- Stoke-upon-Trent* (16,000)—China and pottery works.
- Stone* (5,669)—Brewing; boot and shoe making.
- Tipton* (30,013)—Iron works; collieries.
- Tunstall* (14,244)—Iron works; pottery and china works.
- Uttoxeter* (7,957)—Clock making; agricultural machinery.
- Walsall* (58,808)—Locks; bit and saddlery making.
- Wednesbury* (24,564)—Iron works; tube making.
- Willenhall* (16,067)—Lock making.
- Wolverhampton* (75,738)—Iron works; collieries; tinplate works; japanned ware; lock making.
- SUFFOLK (356,863)—Agriculture; textiles.
- Beccles* (5,721)—Printing.
- Bury St. Edmunds* (16,211)—Corn market; malt-ing and brewing; agricultural machinery.
- Clare* (4,738)—Silk and coir weaving.
- Haverhill* (3,685)—Silk weaving.
- Ipswich* (50,762)—Shipping port; agricultural machinery; boot and shoe making; manure works; silk weaving.
- Leiston*—Agricultural machinery.
- Melford* (5,898)—Horse-hair weaving and flax scutching.
- Stowmarket* (4,052)—Gun-cotton factory.
- SURREY (1,435,842)—Agriculture; metropolitan industries.
- London*—
- Battersea*—Candle making; crucible making.
- Bermondsey*—Leather dressing.

- Lambeth*—Pottery; glass works; wood working.
Southwark—Printing; oil and colour works.
Wandsworth—Paper making; brass works; yacht building; hat and cap making; rice cleaning.
Chisleworth—Printing; powder mills.
Croydon (78,947)—Clock and bell founding.
Epsom (6,276)—Horse training.
Farnham (4,530)—Hop growing; malting.
Godalming (2,505)—Paper making; hosiery tanning.
Guildford (10,858)—Corn market; brewing.
Hackbridge—Paper making; tanning.
Haslemere—Walking-stick making.
Kingston (19,875)—Brush and cocoanut fibre making.
Merton—Brass founding; silk weaving.
Mitcham—Flower and lavender growing.
Thames Ditton—Bronze casting.
SUSSEX (490,316)—Agriculture; sheep farming.
Hastings (42,256)—Fisheries.
Keymer—Chemical works.
Littlehampton (3,894)—Shipping.
Newhaven—Steam-shipping port.
Shoreham (3,572)—Shipping port.
WARWICKSHIRE (737,188)—Agriculture; iron; steel; brass; hardware; coal.
Atherstone (14,390)—Collieries; hat and cap making.
Bedworth—Coal mining.
Birmingham (400,777)—Iron; steel; guns; leather.

Coventry (42,111)—Ribbon and elastic net making; bicycle and watch making.

Leamington (25,138)—Coach building.

Nuncaton (8,465)—Cotton spinning.

Rugby (9,890)—Lias-clay digging.

Stratford-on-Avon (8,053)—Brewing.

Tamworth (4,888)—Collieries; paper making.

WESTMORELAND (64,184)—Agriculture; sheep farming.

Ambleside (10,442)—Powder mills (Elter water).

Kendal (13,696)—Woollen weaving.

Shap—Granite quarrying.

Staveley—Bobbin making.

WILTSHIRE (258,967)—Agriculture; sheep farming; textiles.

Bradford (4,935)—Cloth making.

Chippenham (4,495) — Agricultural machinery; cloth weaving.

Corsham—Oolite quarrying.

Devizes (6,645)—Corn market; cloth weaving.

Malmesbury (3,133)—Silk weaving.

Salisbury (14,576)—Corn market; paper making.

Seend—Iron works.

Swindon (22,365)—Railway works.

Trowbridge (11,041)—Cloth trade.

Westbury—Iron-ore mining and smelting.

Wilton (1,826)—Carpet making.

WORCESTERSHIRE (380,291) — Agriculture; hops; iron; coal; salt.

Bromsgrove (7,959)—Nail making.

Droitwich (3,761)—Salt making.

- Dudley* (46,233) — Iron works; collieries; nail making.
- Evesham* (5,112) — Glove making; fruit growing.
- Halesowen* — Nail making; collieries.
- Kidderminster* (24,270) — Carpet weaving.
- Kinver* — Tinplate works.
- Oldbury* — Railway carriage making.
- Redditch* (9,964) — Needle and fish-hook making.
- Stoke* — Salt works.
- Stourbridge* (9,756) — Collieries; fire-clay digging; glass making; tinplate works.
- Worcester* (33,955) — Hop market; glove making; engine works; china and porcelain works.
- YORKSHIRE (2,886,309) — Agriculture; textiles; iron; coal; glass; cutlery.
- Barnsley* (29,789) — Collieries; linen and towel weaving.
- Batley* (27,514) — Shoddy and woollen trade.
- Beverley* (11,442) — Waggon building; agricultural machinery.
- Bingley* (8,972) — Worsted and woollen trade.
- Bradford* (183,032) — Worsted and stuff trades; iron works.
- Brighouse* (7,964) — Cloth trade.
- Castleford* (10,523) — Glass bottle making; collieries.
- Cleckheaton* (10,653) — Woollen and cloth trades.
- Coverdale* — Cheese making.
- Dewsbury* (29,617) — Army clothing and blanket making; shoddy trade.
- Doncaster* (21,130) — Railway works.
- Elland* (8,278) — Woollen trade; flagstone quarrying.

Goole (10,339)—Shipping port; potato growing.

Grassington—Lead mining.

Guisborough (6,616)—Iron-ore mining.

Halifax (73,363)—Woollen and worsted trade;
carpet weaving.

Hawes—Woollen knitting; butter making.

Heckmondwike—Woollen and shoddy trade.

Holmfirth—Cloth trade.

Honley (5,070)—Cloth trade.

Huddersfield (81,825)—Cloth trade.

Hull (154,250)—Shipping port; iron foundries;
oil and seed crushing; fisheries.

Keighley (25,245)—Woollen and worsted trade;
washing machine making.

Leeds (309,126)—Iron works; collieries; cloth trade;
flax spinning; boot and shoe making; hat and
cap making; engineering.

Loftus (8,750)—Iron-ore mining.

Malton (8,750)—Horse training.

Masham (2,174)—Bell founding.

Meltham (4,530)—Woollen cloth trade.

Middlesborough (55,288)—Iron and steel making;
ship building; engineering; machinery works;
pottery.

Normanton (6,319)—Coal mining.

Otley (6,803)—Cotton and woollen spinning.

Pateley Bridge—Lead mining.

Patrington—Flax growing and dressing.

Penistone (2,254)—Iron and steel works.

Pontefract (8,798)—Liquorice growing.

Reeth—Lead mining.

Rosedale—Iron-ore mining and smelting.

Rotherham (34,782)—Iron and steel works; collieries.

Saddleworth—Woollen cloth trade.

Saltaire—Alpaca cloth trade.

Settle—Cotton spinning.

Sheffield (284,210)—Iron and steel works; glass making; cutlery; Britannia metal.

Shipley (15,089)—Woollen and worsted trade.

Skipton (9,019)—Cotton spinning; limes one quarrying.

Wakefield (30,573)—Corn market; woollen cloth trade.

Whitby (14,014)—Jet working; ship building; fisheries.

York (54,198)—Confectionery; glove making.

WALES.

ANGLESEA (50,964)—Coal; copper.

Amlwch—Copper mining and smelting.

Holyhead—Mail station for Ireland.

Llangefni—Collieries.

BRECONSHIRE (57,735)—Agriculture; coal and iron.

Brynmawr (5,394)—Iron works; collieries.

Clydach—Iron works; collieries; limestone quarrying.

Crickhowell—Paper making; flannel weaving.

Ynisciedwin—Iron works; collieries.

Ystalyfera—Iron works; collieries.

CARDIGANSHIRE (70,226)—Agriculture; sheep farming; lead mining.

- Aberystwith* (6,664)—Lead mining.
Cardigan (3,633)—Shipping port.
- M**—**MERTHARTYNSHIRE** (124,861)—Agriculture; iron; coal; copper smelting.
Kidwelly—Tinplate works.
Llanelly (19,665)—Copper, iron, and tinplate works; collieries.
Pembrey—Copper works.
- N**—**CAERNARVONSHIRE** (119,195)—Sheep farming; slate.
Bangor (8,240)—Slate shipping port.
Bethesda (6,890)—Slate quarrying.
Caernarvon (10,237)—Slate shipping port.
Nantlle—Slate quarrying.
- D**—**DENBIGHSHIRE** (108,931)—Sheep farming; iron; coal.
Llangollen (3,000)—Brewing; limestone quarrying; woollen weaving; slate quarrying.
Ruabon—Collieries; iron works.
Ruthin (3,034)—Mineral water making.
Wrexham (10,928)—Collieries; iron works.
- F**—**FLINTSHIRE** (80,373).
Bagillt—Lead smelting.
Flint (5,126)—Chemical works.
Holywell (3,091)—Lead mining and smelting.
Mold (4,320)—Coal and oil shale mining.
Mostyn—Collieries; coal shipping.
- G**—**GLAMORGANSHIRE** (511,672)—Agriculture; iron; coal; copper smelting.
Aberavon (3,396)—Copper smelting.
Aberdare (33,796)—Iron works; collieries.
Briton Ferry (5,998)—Iron and tinplate works.
Caerphilly—Collieries; tinplate works.

- Cardiff* (85,378)—Shipping port ; iron and tinplate works.
- Llandaff*—Iron works.
- Llandore*—Steel works.
- Llantrissant*—Iron-ore mining ; collieries.
- Merthyr-Tydvil* (48,857)—Iron and steel works ; collieries.
- Morrison*—Copper smelting.
- Neath* (10,447)—Shipping port ; copper smelting.
- Pontypridd* (12,317)—Iron works ; chain and anchor works ; tinplate works ; collieries.
- Rhondda Valley*—Collieries.
- Swansea* (63,739)—Shipping port ; copper smelting ; patent fuel works ; collieries.
- MERIONETHSHIRE (54,793)—Sheep farming ; slate.
- Bala* (1,653)—Flannel weaving ; knit hosiery.
- Corris*—Slate quarrying.
- Dolgelly* (2,457)—Flannel weaving ; gold mining.
- Festiniog*—Slate quarrying.
- Portmadoc*—Slate shipping.
- MONTGOMERYSHIRE (65,798)—Agriculture ; flannel ; lead.
- Llanidloes* (3,421)—Flannel weaving ; lead mining.
- Newtown* (7,170)—Flannel weaving.
- Welshpool* (7,090)—Flannel weaving.
- PEMBROKESHIRE (91,808)—Agriculture ; coal.
- Milford Haven* (3,803)—Shipping port.
- Pembroke* (14,197)—Government ship yard.
- Saundersfoot*—Collieries ; iron works.
- RADNORSHIRE (23,539)—Agriculture.
- Knighton*—Woollen weaving.
- New Radnor*—Lime burning.

SCOTLAND.

BERDEENSHIRE (267,963).

Aberdeen (105,003)—Granite works; linen and woollen factories; iron works; shipbuilding; preserved provisions.

Alford—Granite quarries.

Culter—Paper mills.

Findon—Dried haddocks.

Peterhead (10,992)—Granite quarries; whale fishing; shipping.

Turriff—Flax, thread and brown linen factories.

—**ARGYLESHIRE** (76,440).

Ballachulish (pronounced Ballahoolish)—Slate quarries.

Campbeltown (7,558)—Herring fishing; distilleries; collieries.

Easdale—Slate quarries.

Inverary—Herring fishing.

Kilmelfort—Distilling; powder mills.

Loch Fyne—Herring fishing.

Mull—Granite quarries.

Strontian—Lead mines.

AYRSHIRE (217,504).

Ardrossan—Iron works; coal shipping.

Dalmellington—Iron works; collieries.

Galston—Weaving.

Irvine (8,503)—Coal shipping.

Kilmarnock (24,977)—Carpets; shawls; Scotch bonnets; boots.

Muirkirk—Iron works.

Newmills—Muslin factories.

New Cumnock—Collieries.

Old Cumnock—Collieries.

Saltcotes—Salt and magnesia works.

Stewarton—Scotch bonnet making.

Tram—Coal shipping.

BAFFYSHIRE (62,731).

Buff (6,079)—Shipping port.

Buzie—Herring fishing.

Acet—Horse and cattle fair.

Mackay—Herring fishing; ship building.

CAITHNESS-SHIRE (38,845).

Tenno—Peat-cut quarrying.

Wiz (8,025)—Herring fishing.

CLACKMANNANSHIRE (25,677).

Alva—Woollen and tartan weaving; glass bottle making; iron and copper foundries; brewing; distilling.

Alva—Woollen weaving.

Tillicoultry—Woollen and tartan weaving.

DUMBARTONSHIRE (75,327).

Alexandria—Cotton bleaching and dyeing; print works.

Dumbarton (13,782)—Ship building; iron founding.

Renton—Print works; Turkey red dyeing.

Milngavie (pronounced Milngay)—Print and bleach works.

DUMFRIESSHIRE (76,124).

Annan (3,366)—Shipping port; cotton spinning.

Dumfries (17,090)—Woollen and hosiery manufacture.

Lockerbie—Sheep fairs.

Maxwelltown—Cloth manufacture.

Wanlockhead—Lead mines.

EDINBURGHSHIRE (388,977).

Dalkeith—Collieries.

Edinburgh (228,190)—Brewing; printing; book-binding.

Leith (58,193)—Shipping port; rope and cordage making; milling; iron and copper foundries; distilling; oil and seed crushing.

Lasswade—Carpet making; paper making.

Newhaven—Fishing.

ELGIN (43,760).

Elgin (7,388)—Tanning.

FIFESHIRE (171,960).

Dunfermline (17,085)—Linen and diaper factories; collieries.

Falkland—Linen weaving.

Kirkcaldy (15,055)—Shipping port; rope making; oilcloth making; limestone quarrying.

Leslie—Flax and bleaching works.

FORFARSHIRE (266,374).

Arbroath (21,758)—Canvas and sacking making.

Brechin (9,031)—Linen weaving.

Dundee (140,054)—Flax and jute spinning and weaving; shipping port; iron foundries; agricultural machinery; marmalade making.

Forfar (12,818)—Linen factories.

Montrose (14,975)—Linen trade; shipping port.

Kirriemuir—Brown linen trade.

HADDINGTONSHIRE (38,472).

Dunbar (3,651)—Herring fishing.

North Berwick (1,698)—Herring fishing.

Prestonpans—Brewing ; collieries.

INVERNESS-SHIRE (90,414).

Portree (Isle of Skye)—Woollen factory.

KINCARDINESHIRE (34,460).

KINROSS-SHIRE (6,699).

Kinross—Linen and woollen weaving.

KIRKCUDBRIGHTSHIRE (42,126).

Dalbeattie—Granite quarries.

LANARKSHIRE (904,405).

Airdrie (13,363)—Collieries ; iron works.

Blantyre—Collieries ; cotton spinning.

Carluke—Iron works ; collieries.

Coatbridge—Iron works ; collieries.

Garnkirk—Tile and pipe making.

Gartsherrie—Iron works ; collieries.

Glasgow (487,948)—Shipping port ; sugar refining ;
woollen and cotton spinning ; iron works ; railway
works ; chemical works.

Hamilton (13,997)—Iron works ; collieries.

Leadhills—Lead mining.

Motherwell—Iron works ; collieries.

New Lanark—Cotton spinning.

Newmains—Iron works ; collieries.

Wishaw—Iron works ; collieries.

LINLITHGOWSHIRE (43,198).

Bathgate—Collieries ; oil shale distilling.

Bo'ness—Shipping port.

Linlithgow (3,913)—Boot and shoe making.

West Calder—Oil shale distilling.

NAIRNSHIRE (10,454).

ORKNEY AND SHETLAND (61,746).

Lerwick—Shipping port.

PEEBLESSHIRE (13,819).

PERTHSHIRE (128,985).

Auchterarder—Woollen weaving.

Perth (28,948)—Dying and bleaching.

RENFREWSHIRE (262,981).

Greenock (63,899)—Shipping port ; sugar refining ; rope making ; engineering.

Johnstone—Cotton spinning ; brass founding.

Paisley (55,642)—Cotton ; woollen ; tartan ; thread and shawl manufactories.

Port Glasgow (10,801)—Shipping port ; cotton spinning.

ROSS-SHIRE AND CROMARTY (78,539).

Stornoway—(Hebrides) ; oil distillery from peat.

ROXBURGHSHIRE (53,445).

Hawick (16,184)—Woollen and hosiery trades.

Langholm—Woollen weaving.

SELKIRKSHIRE (25,562).

Galashiels (12,434)—Woollen and hosiery trades.

Selkirk (6,090)—Boots and shoes.

STIRLINGSHIRE (112,437).

Bannockburn—Tartan weaving.

Carron—Iron works.

Falkirk (13,165)—Iron works ; collieries.

Grangemouth—Shipping port.

Lennoxtown—Bleaching and print works.

St. Ninians—Nail making.

SUTHERLANDSHIRE (23,366).

Brora—Collieries.

WIGTOWNSHIRE (38,602).

Port Patrick—Steamer station for Ireland.

Stranraer (6,342)—Shipping port.

IRELAND.

ANTRIM (423,171)—Flax ; linen ; wool ; shipbuilding ; salt.

Ballycastle—Coal mining.

Ballymena—Linen trade.

Belfast (207,671)—Shipping port ; flax spinning and linen weaving ; iron foundries.

Carrick-fergus (10,009)—Salt works ; linen weaving.

Coleraine (6,684)—Flax and linen trades ; salmon fishery.

Larne—Shipping port ; linen trade.

Lisburn (10,834)—Flax and linen trades.

Moirá—Flax and linen trades.

ARMAGH (162,823)—Flax ; linen ; wool.

Lurgan—Linen trade.

Portadown—Linen trade.

CARLOW (46,508)—Coal.

CAVAN (129,008)—Flax and wool.

CLARE (141,210).

CORK (492,810)—Copper ; lead ; wool ; butter.

Berehaven—Copper mining.

Cork (97,526)—Shipping port ; butter trade ; distilling.

Kanturk—Coal mining.

Kinsale (5,560)—Fisheries.

Mallow (4,437)—Preserved-milk manufacturing.

Middleton—Distilling.

Youghal (6,040)—Fisheries ; shipping port.

DONEGAL (205,443)—Flax ; fisheries ; granite.

Ballyshannon—Salmon fisheries.

- Lifford*—Flax trades.
Donegal—Rope and twine making.
Carrick—Knit hosiery making.
- DOWN (269,927)—Flax; linen; wool; granite.
Banbridge—Linen trade.
Dromore—Linen trade.
Hillsborough—Linen trade.
Newry (15,085)—Shipping port; flax, linen and cotton trade; granite quarrying and polishing.
- DUBLIN (418,152).
Dublin (273,064)—Shipping port; provision trade; tobacco and snuff making; brewing; leather trade.
Killiney—Granite quarrying.
Kingstown—Mail packet station.
- FERMANAGH (84,633)—Wool; marble; pottery.
Belleek—Pottery.
Castle Caldwell—Cement making.
Enniskillen (5,842)—Limestone quarrying; linen and woollen weaving.
- GALWAY (241,662)—Marble and serpentine.
Ballinasloe—Sheep fairs.
Galway (18,906)—Shipping port; timber trade; salmon fisheries; woollen and jute manufactories.
- KERRY (200,448)—Copper; wool; fisheries.
Valentia—Slate quarrying.
- KILDARE (76,102)—Agriculture.
- KILKENNY (99,064)—Coal; iron ore.
Castle Comer—Anthracite collieries.
- KING'S COUNTY (72,668)—Agriculture.
- KITRIM (89,795)—Coal; iron ore.

LIMERICK (177,203)—Wool ; fisheries.

Limerick (48,246)—Shipping port ; provision trade ; snuff making ; army clothing.

LONDONDERRY (164,714)—Flax ; wool ; iron ore.

Londonderry (28,947)—Shipping port ; linen and leather trades ; clothing.

Moville—Shipping port for American steamers.

LONGFORD (60,790)—Agriculture ; flax.

LOUTH (78,228)—Shipping ; agriculture ; cotton.

Carlingford—Oyster fishery.

Drogheda (14,662)—Shipping port ; cotton spinning ; leather trade.

Dundalk (12,294)—Shipping trade ; distilling.

MAYO (243,030)—Serpentine ; granite ; wool.

MEATH (86,301)—Agriculture.

Balbriggan—Knitted hosiery manufacture.

MONAGHAN (102,590)—Flax ; wool.

QUEEN'S COUNTY (72,598)—Agriculture.

ROSCOMMON (131,755)—Agriculture ; pipeclay.

SLIGO (110,955)—Agriculture.

Sligo—Shipping port ; salmon fishing.

TIPPERARY (199,004)—Agriculture ; wool.

TYRONE (997,233)—Coal ; iron ore ; flax ; wool.

Dungannon (4,081)—Coal mining.

Newton Stewart—Flax and linen trade.

Stewartstown—Flax trade.

Strabane—Flax trade.

WATERFORD (113,225)—Copper ; agriculture ; butter ; wool.

Dungarvan (7,377)—Shipping port ; distilling.

Knockmahon—Copper mining.

Portlaw—Shipbuilding ; frieze making.

Waterford (28,952)—Shipping port ; butter trade ; timber trade.

WESTMEATH (71,513)—Agriculture.

WEXFORD (123,587)—Agriculture.

New Ross (6,626)—Flour mills ; distilling.

Wexford (12,055)—Shipping port.

WICKLOW (73,679)—Copper ; lead ; slate.

Arklow—Chemical manure and sulphuric acid making.

Ovoca—Copper mining.

Wooden Bridge—Slate quarrying.

1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

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THE UNITED STATES.

MOUNTAIN RANGES, WATERWAYS, AND CLIMATE.

THE territory of the United States occupies the greater portion of the continent of North America, extending from the Atlantic Ocean on the east to the Pacific Ocean on the west, and from the chain of great lakes, to the north of which lies Canada, to the Gulf of Mexico on the south. The area of this vast country is more than $3\frac{1}{2}$ million square miles ; its greatest length being 2,650 miles, and its greatest breadth 1,600. The extent of the Atlantic coast line is 7,000 miles, it being indented by several inlets of the sea, such as the Chesapeake, Delaware, and Massachusetts bays, and Albemarle and Pamlico sounds, while the projections of the land seaward consist of Cape Cod, and a large proportion of the State of Florida, which acts as a huge bulwark between the Atlantic and the Gulf of Mexico. The coast line on this side is 3,400 miles, and on the Pacific side 3,700, as the latter coast is much more regular in its outline, presenting but very few inlets or projections.

The Bay of San Francisco is the largest of these, though even this is of no great size.

Like most of the natural dispositions of the United States, the mountain ranges are on a very grand scale, though they all belong to two or three well-defined systems. In the Eastern States the great system is that of the *Alleghany* or Appalachian range, which, under one name or another, runs north-east to south-west through three-fourths of the whole country ; in some parts consisting of one chain, in others of several parallel chains, with beautiful valleys between. In the extreme north-eastern State, that of Maine, the range is known as the Maine Highlands, of which the highest point is Mount Katahdin, 3,585 feet. In New Hampshire they form the White Mountains, noted for their grand scenery, Mount Washington rising to 6,234 feet, and Mount Adams to 5,960, while in the adjoining State of Vermont they are called the Green Mountains. To the south, in the State of New York, they are known as the Adirondacks (highest point, Mount Marcy, 5,402 feet), and the Catskill Mountains. South of Pennsylvania, where are the Blue Mountains, the Tuscarora Hills and other smaller ranges, commence the Alleghanies proper, which extend for some 1,300 miles, with an average breadth of 70 miles. In Virginia State the principal heights are those of the Blue Ridge, the most lofty peak of the whole range being Mount Clingman, 6,941 feet, in North Carolina, though Mount Mitchell is not far short of it at 6,732 feet. The Alleghanies finally die out in Alabama.

The next large system, that of the *Rocky Mountains*,

is on a far more extensive scale, running the whole length of the United States, and forming the chief watershed between the Atlantic and the Pacific. The term Rocky Mountains more properly belongs to that portion between British North America and lat. 38° , being from thence to Mexico known as the Sierra Madre, or Mother range. An important range called the Black Hills, branches off at about 40° lat., extending nearly to the Missouri river. The heights of the Rocky Mountains are very lofty, the chief being Fremont's Peak, 13,750 feet, in Wyoming; Long's Peak, 14,270; and Pike's Peak, 14,147 feet. The *Pacific*, the third and last great system, lies westward of these ranges, and is grouped into the Coast Mountains, extending alongside the Pacific from the south of California to Vancouver's Island; the Sierra Nevada, lying between 35° and 42° lat.; and the Cascade Ranges to the north, which contain the highest peaks in the whole States, reaching, in Mount Elias (Alaska) to 17,900 feet; Mount Fairweather (Alaska), 14,700 feet; Mount Hood (Oregon), 14,000 feet; Mount Shasta (California), 14,000 feet; Mount St. Helen's (Washington), 13,300 feet. The great importance of these mountain ranges to the States is very evident, partly from the enormous volume of the rivers to which they give birth, but mainly from the extraordinary richness and variety of the mineral treasures that they contain, surpassing those of any other country.

The river systems are on the same colossal scale as those of the mountains, and are of very great value to the States, both from the extensive areas fertilised

by them, and the convenience of transportation. Before specifying, however, the river basins, previous mention ought to be made of the lake series, those vast reservoirs of inland waters, which in extent surpass any similar system in the world. The great chain of lakes, known as Superior, Michigan, Huron, Erie, and Ontario, constitutes the boundary between British North America and the United States, the dividing line running lengthways through the middle of all of them excepting Michigan, which belongs entirely to the latter. The following are the areas and volumes of these inland seas :—

	Area.		Length.		Depth.
Lake Superior,	31,500 square miles,		480 miles,		1000 feet.
„ Huron,	23,100 „		252 „		1000 „
„ Michigan	23,150 „		320 „		1000 „
„ Erie	7,800 „		250 „		120 „
„ Ontario	6,900 „		190 „		500 „

By means of this chain of lakes, which find their outlet by the St. Lawrence River, a water channel, capable of accommodating large vessels, is provided from the very heart of the grain and provision supplying States, so that a ship loaded at Chicago, on Lake Michigan, can proceed without change or hindrance direct to the docks at Liverpool, the Niagara Falls being avoided by the Welland Canal.

The river basins are as follows :—

1. The *St. Lawrence*, which conveys the waters of the lakes to the Atlantic, drains portions of the States of Vermont, New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Minnesota, and the whole of Michigan, and is marked by a paucity of tributaries all along its southern or American course.

2. The *Atlantic* basin comprises the system of rivers which, for the most part, rise in the Alleghany Mountains, and flow eastward into the Atlantic, after a not very long career. These rivers consequently do not rank amongst the largest in America, and from the character of the country have the earliest portions of their course through hilly ground, giving rise to flourishing manufacturing towns, while the latter portion lies in the more level coast districts, affording more or less facilities for navigation. The chief of these rivers is the Hudson, which rises 4,000 feet above the sea amongst the Adirondack Mountains, in New York State, and has a course of 300 miles, being navigable for 150 miles, as far up as Troy. The Delaware rises in the Catskill Mountains, and, after receiving the Lehigh and Schuylkill rivers, falls into Delaware Bay below Philadelphia. The Susquehanna and the Potomac both fall into Chesapeake Bay, the one below Baltimore, the other below Washington, to both which places they are navigable. The James River rises in the Alleghanies, and has the same outlet as the two preceding ones, some distance below Richmond.

3. The *Mississippi* basin is a gigantic river system, occupying more than one-third of the entire area of the United States, and covering over 1,300,000 square miles. The Mississippi itself rises in Itasca Lake in Minnesota, very near the source of the Red River, and falls into the Gulf of Mexico below New Orleans, after a course of 2,900 miles, of which enormous distance 2,200 miles are navigable as far as the Falls of St. Anthony. Notwithstanding the volume of this mighty waterway, that of its so-called tributary, the

Missouri, is greater. This latter river rises in the Rocky Mountains, in the State of Montana, near the source of the Columbia, and after a course to the south-east of 3,096 miles, of which 2,500 miles are navigable, joins the Mississippi at St. Louis. Another great tributary of this system is the Ohio, formed by the union at Pittsburg, in Pennsylvania, of the Alleghany and Monongahela rivers. It joins the Mississippi at Cairo, after having for some time served as the boundary line between Kentucky and Illinois. Its length is 1,000 miles, entirely navigable by means of an artificial cut of two and a half miles at Louisville. Amongst the other chief tributaries of the system are the Yellowstone, the White River, and the Platte River, all joining the Missouri; the Arkansas and the Red River flowing into the Mississippi, and possessing amongst them an aggregate navigable stream of 5,000 miles. The whole of the system, therefore, is navigable for nearly 13,000 miles—a water accommodation such as no other country in the world can show.

4. The *Texas* basin comprises those considerable rivers which fall into the Gulf of Mexico, west, and independently of the Mississippi, draining the States of Texas and New Mexico, with parts of Colorado and Louisiana. The rivers are not numerous, but of considerable size, and from the nature of the country they are not of commercial importance. The principal ones are the Rio Grande, rising in the Sierra de la Plata, in Colorado, and having a course of 1,800 miles; and the Texan Colorado, of about half that length.

5. The *Pacific* basin comprises all those rivers that

flow from the various ranges of the Rocky Mountains into the Pacific Ocean, most of them having a westward course, though one very large stream, the Colorado, runs south to enter the Gulf of California. Its length is over 1,100 miles, and that of the Columbia, in the northern district of the Pacific slope, about 1,200. The other great river of this group is the Sacramento, with its tributary the San Joaquin, draining the richest mineral treasure ground in the world. The Columbia is partly navigable for some distance, but in general the characteristics of the rivers of the Pacific slope are those of marvellous scenery and vast developments of nature, rather than capabilities for commercial purposes. Amongst the peculiarities of the rivers of this region we must not omit to mention the *Great Inland* basin, in which the Salt Lake and its singular system of tributaries (self-dependent, and communicating with no seas) drain the States of Nevada and parts of Oregon, California, Utah, and Idaho. The Humboldt River in this basin is 350 miles long, but nowhere broader than a millstream.

The chief available waterways of the United States for steamers and large-sized vessels may thus be summed up :—

The Lakes	...	...	...	1,490 miles.
Hudson River	...	...	...	150 "
Delaware	...	...	...	100 "
Mississippi	...	...	...	2,200 "
Missouri	...	...	...	2,500 "
Ohio	...	...	...	1,000 "
Tributaries to the Mississippi	...	...	...	5,000 "
Total				12,440 "

It will easily be seen, from the foregoing statement of physical geography, how varied must be the climatic differences of the United States. Not only is there an enormous superficial area to be taken into account, varying from 50° to 25° lat., but the whole of this area is acted upon by many natural influences, such as the proximity of two great oceans, the Atlantic and Pacific, the gigantic chains of mountains, and the still more gigantic river basins. The consequence is, that climate in the United States frequently shows the most contradictory phases. "A summer heat of the fiercest character, as at Fort Miller, San Joaquin Valley, California, is but a few miles removed from a season of even more extreme refrigeration, cold enough to require winter clothing at the mid-day of the summer." As an evidence of the intensity of the climatic changes, it is stated that the mean temperature of New York is the same as that of Liverpool, yet the difference between the mean temperature of the three summer months and that of the three winter months is twice as great in New York as in Liverpool. Throughout England the heat of summer is insufficient to ripen Indian corn, while the ivy that grows luxuriantly in England can scarcely survive the severe winters of New York.

COAL BASINS.

LIKE every other country which has obtained any degree of industrial supremacy, America depends principally upon her coal measures, which, even taking into account the enormous extent of territory covered by the American flag, are a matter of wonder both to the geologist and industrial observer. Nature was in one of her most bountiful moods when she stored up such vast reservoirs of fuel for the future States, for there is no country on this earth which possesses coal-fields of such extraordinary thickness and extent. Though comparatively young in years, America already stands second of the coal-producing countries of the world, Great Britain being the first. Before going into the details of the American coal-fields, it will be well to give a general outline of their extent as far as known; for it must be borne in mind that the progress of coal discovery has been rapidly developing, as the more recent States in the west have become settled. In 1845, for instance, the area of coal measures was stated to be 145,000 square miles, whereas in 1866 it was known to exceed 200,000; and in 1873 it was estimated at 291,485, with the strong probability of the existence of as many more in the west. The amount of coal contained beneath this surface may be fairly considered illimitable, for the Pennsylvanian coal-beds alone, which occupy only 12,472 square miles out of the number, are estimated to contain a supply which, at the present consumption of 20 or 25 million tons per annum, would last for 640 years, even if 50 per cent. were allowed for waste.

The coal-beds of the United States may thus be summarized, taking them from east to west :—

1. The *New England* field, which occupies an area of 500 square miles in the States of Vermont, Massachusetts, and Rhode Island. The coal-beds, which consist of anthracite, or stone coal, underlie the cities of Providence and Newport, but they have been worked in a desultory manner and are not very important commercially.

2. The *Pennsylvanian* anthracite field is of limited extent, only 470 square miles, but of enormous productiveness and value. There are also very large bituminous beds in Pennsylvania to which allusion will be made further on ; and though the anthracite coals of the United States bear no proportion in the extent of the measures to the bituminous coals, they possess features of remarkable interest, no country in the world being able to show such a development of anthracite, or so much energy in working it. These coals lie almost entirely within the State of Pennsylvania ; commencing a little to the north-west of Philadelphia, and occupying in the main two oblong districts about 40 and 60 miles long respectively. The production for 1877 was as follows :—Wyoming district, 8,300,000 tons ; Lehigh district, 4,400,000 ; Schuylkill district, 8,600,000 ; Loyalsock district, 23,000, the total yield of the year being 21,323,000. The whole workable amount of the Pennsylvanian field is estimated at 13,180,288,000 tons, one-third of which is in the area owned by the Philadelphia and Reading Iron and Coal Company, one of the largest of the American corporations. The coal strata have

been geologically much disturbed, the result of which is that the beds lie near the surface (requiring no very deep coal-pits) and that they are of extreme thickness—one of them, indeed, called the Mammoth Vein, varying from 40 to 100 feet. In the north-eastern portion of the State, the whole district underneath the Lackawanna Valley is completely honey-combed with anthracite workings, the towns of Carbondale and Scranton, with a population of about 50,000, being built on them; and the coal is carried away by a most ingenious railway, called the “gravity line,” which runs over the mountains for 16 miles to the shipping places by a series of inclined planes worked by twenty-eight stationary engines.

3. The *Alleghany* field is an enormous one, occupying 53,895 square miles in the States of Pennsylvania, Ohio, Virginia, West Virginia, Kentucky, Tennessee, Alabama and Maryland. All these coals are bituminous, or free-burning. Extending as this basin does through so many States, it is necessary to specify the individual areas a little more closely. (a) The Pennsylvanian coals are principally worked in the counties of Tioga and Clearfield in that State, the annual product of the first-named district being about 600,000 tons. (b) The Ohio field occupies 10,000 square miles in that State, coal being worked in upwards of thirty counties. The chief development lies in the south-eastern portion of the State, in the counties of Hocking and Athens, where it has given rise to a considerable iron trade. (c) The Virginian field is extensive, though not worked to the amount of which it is capable. It is apparently an

extension of the Ohio beds, the West Virginian coals, principally gas-coals, occupying an area of 16,000 square miles. The chief mines are found in the valleys of the Kanawha, and New River, and in the neighbourhood of the Ohio and Baltimore railways. There are also large beds of coal in Virginia, on the western side of the Shenandoah Mountains, and in the districts between the James and Potomac Rivers. (d) The Tennessee field is of very great extent, but is comparatively little worked. Its chief mining centres are on the Coal Creek River in Anderson County, not far from Chattanooga. (e) The Maryland field is largely worked at Cumberland, the annual yield being nearly 2 million tons. (f) The Kentucky field occupies the south-western portion of that State to the north of the Cumberland plateau, and is continuous with the beds of the Tennessee field. Kentucky is fortunate in sharing, in its eastern portion, some of the beds of the central field. (g) The Alabama field is also continuous with the Tennessee coal measures, a good deal of coal being mined in the valley of the Tennessee River, near Decatur, and sent by rail to the iron district of Nashville.

4. The *Central* coal-basin is of great importance, embracing 40,000 square miles in the States of Indiana, Illinois, Kentucky, Iowa, Missouri and Arkansas. (a) The Illinois field occupies the lion's share of the Central basin, the beds running across the state from Wilmington, near Chicago, in a south-westerly direction to Springfield and the Mississippi valley. There are more than 350 mines in this State, yielding annually 2 million tons. (b) The

Indiana field is continuous with that of Illinois on the east, and is worked in fifteen counties. The Central basin extends westward of the Mississippi into (c) Arkansas, where are 12,000 square miles of coal; (d) Iowa, where the beds are worked in thirty counties; and (e) Missouri, containing 23,000 square miles, some of the veins being of enormous thickness.

5. The *Northern* coal-basin is in the State of Michigan, occupying 12,000 square miles.

6. The *Western* basin is situated in the State of Kansas, where it underlies an area of 17,000 square miles.

In addition to these known and tolerably defined coal-basins, there are more or less productive beds in the Territories of Utah (yielding about 10,000 tons per annum), and Wyoming (47,000 tons), while coal measures are known to exist in Texas and Nebraska States, as well as in the Territories of Arizona, Montana and New Mexico. In the State of Colorado there are beds of anthracite and bituminous coals (though of tertiary and not carboniferous age) on the western sides of the Rocky Mountains, while considerable beds of the same age exist in California and Oregon, something like 350,000 tons being annually shipped at San Francisco.

It will thus be seen that in the coal-basins already worked, the United States possesses incalculable riches, without taking into consideration those which are known to exist, but which are biding their time for yielding up their treasures.

IRON AND STEEL.

It is not difficult to predict, that with so large a stock of coal, the United States must possess also an extensive iron trade. Indeed, as in England, the iron and coal trades are the basis of American manufactures, and, to a great extent, the index of the current prosperity. America contains underneath her surface immense supplies of iron ore, beside which those of England are insignificant. This may appear somewhat paradoxical, as the English production amounts annually to some 16 million tons, while the American yield is only about 5 million tons. But whereas we have practically used up some of our districts, such as the coal measure ores of South Wales, America has only just scratched hers, and possesses such extensive deposits, that they must necessarily at some time or other feed a very large trade. Roughly speaking, the yield may be summarized as follows :

Coal measure or clay ironstone ...	750,000 tons.
Hematites and oxides of iron, viz. :—	
Lake Superior deposits ...	1,000,000 „
Lake Champlain „ ...	350,000 „
Cornwall Banks „ ...	150,000 „
Missouri „ ...	250,000 „
New Jersey „ ...	400,000 „
Brown and red ores in different	
States ...	1,200,000 „
Sundries ...	500,000 „
<hr/>	
Total ...	4,600,000 „

The *clay* ironstones which figure first in this list are

principally found in South Ohio and North Kentucky, in the district known as the Hanging Rock ; and there is also a vein at Johnstone, Pennsylvania, the yield being about 40 per cent. of iron. The kind of clay ironstone known as blackband is worked in the Mahoning valley, in that of the Tuscarawas (Ohio), and as far south as the coal-fields of Alabama.

Specular *hematite* ore is found near Lake Superior and Lake Champlain, in the former district between Escanaba and L'Anse, with still more extensive deposits in the vicinity of Ishpenning and Negaunee. It is rich in iron—from 60 to 66 per cent.—though a good deal interspersed with blocks containing very poor ore. Most of this Lake Superior ore is used in the furnaces at Pittsburg, in Pennsylvania, the great drawback being the distance of transportation, which is 790 miles. Notwithstanding the expense caused by this, these ores are much in request on account of their freedom from phosphorus, which makes them particularly adapted for producing Bessemer pig for steel.

The ores found at Lake Champlain (the boundary between the States of New York and Vermont) are nearly of the same kind as those of Lake Superior, Port Henry, on the western shore, being the shipping port. A similar class of iron ore is worked in Missouri, the locality known as the Iron Mountain being one of the largest known deposits in the world. It is a nearly pure peroxide, containing 70 per cent. of metallic ore, almost free from any admixture of foreign matter, and having a thickness in some places

of 70 feet. A little to the south of this are the iron deposits of Shepherd Mountain, Pilot Knob and Cedar Mountain, all rich in metallic iron.

Magnetic ore is largely developed in New Jersey, with a percentage of iron of about 55, but possessing so much phosphorus as to make it unfit for Bessemer steel. The same ores are found in Massachusetts, where the "Iron Hill" at Cumberland is a mass of ore 500 feet long and 104 high, yielding 35 per cent., but remarkably free from phosphorus and sulphur; also in Rhode Island and Vermont; and to some extent in the Smoky Mountains in North Carolina.

Brown hematites abound in Pennsylvania, the largest deposits being at the Cornwall Banks in Lebanon County, about 85 miles west of Philadelphia. It is from these ores and those of the same character in Montgomery County on the east bank of the Schuylkill, in Berks and Northampton Counties, that the busy ironmaking district of Lehigh is supplied. These ores are not particularly rich, and it is singular that Pennsylvania, which is the seat *par excellence* of the American iron trade, should possess the poorest ores of any of the States; but the real reason of her superiority is, that she has made better use of them, and possesses also such inexhaustible beds of iron-making coal. Virginia contains large tracts of brown hematites, in several localities in the Appalachian or Alleghany ranges. The cost of mining in this State is very low, wages having been greatly influenced by the old conditions of slavery. The same brown ores are pretty abundant

in Alabama and Georgia in the districts served by the Alabama and Chattanooga railway.

The latter State, as well as Tennessee, possesses extensive deposits of ore known as *fossiliferous*, of which the Red Mountain, near Birmingham, is a very curious example for its enormous thickness; though its percentage is not very high, being only from 33 to 50 per cent. In addition to these already worked districts, iron ore is found also in the States of Connecticut, Arkansas, California, Indiana, Iowa, Kansas, Minnesota, Maryland, Texas, and Wisconsin; and in the Territories of Alaska, Arizona, Colorado, Dakota, Montana, Utah, and Wyoming. With such enormous mineral deposits, whether well defined or more conjectural, it is no wonder that the United States has developed an iron trade of national importance. In every way indeed, nature has been bountiful; for, to match the iron ores, there are boundless seams of coal ready to be worked in conjunction with the iron: and even in those States where coal is absent, vast forests serve as excellent substitutes. Of course the day will come when charcoal will be found to be too dear and too scarce to be used in this way, as it was with the English trade in Sussex and Kent; but everything is on such a large scale in America, that it will be a long time before this change occurs.

Of all the staple industries of the United States, the iron trade is perhaps the most remarkable, as showing the inexhaustible resources of the country, and the sudden leap which it has made into the front rank of the national wealth and occupations. To

mark the rate of increase in the production of pig iron, it is sufficient to mention that in 1852 it was 50,000 tons, while in 1879 it was 2,741,853 tons; and although the trade has great fluctuations, as with us, the increase within the last quarter of a century has been very extraordinary. In the manufactured iron we find the same strides. Of rolled iron, were produced in 1854,—736,280 tons, whereas in 1879 it amounted to 2,047,484 tons; and the same may be said of rails, and of steel, whether made by the Bessemer process or not. The following table shows that the number of blast furnaces for the production of pig iron is 713, and that their capabilities will enable them to turn out $5\frac{1}{2}$ million tons per annum :—

	No. of furnaces.	Capacity in tons.
Pennsylvania ...	279	2,264,900
Ohio ...	99	863,320
New York ...	57	529,500
Michigan ...	34	268,160
Virginia ...	34	72,400
Georgia and Alabama	26	126,400
Maryland ...	24	98,700
Kentucky ...	23	138,300
Tennessee ...	22	99,400
Missouri ...	19	223,500
New Jersey ...	18	183,600
Wisconsin ...	14	109,700
Illinois ...	12	188,000
West Virginia...	12	99,400
Indiana ...	9	71,500
Other States ...	31	102,450
Total ...	713	5,439,230

It is very seldom, of course, that all this number is

in blast at the same time ; for in bad seasons not more than half the furnaces are producing. The American iron trade differs in some very important points from the English trade ; one being, that the Catalan forge, which is the most primitive style of iron smelting to be found in any country, is still extant in the States, and there are upwards of thirty-nine of these forges where iron is smelted direct from the ore. This, however, can only be done when the ore is cheap and rich, and the charcoal fuel handy. It is said that 60,000 tons per annum are turned out from these, and that the produce is much in favour with the steel makers. Another essential difference between the English and American trade is, that a great majority of the production is smelted with anthracite coal. This, indeed, is the secret of the enormous superiority of Pennsylvania over the other States, for she possesses, as we have seen, inexhaustible beds of anthracite, far surpassing any other deposit of this nature in the world. The proportions of the various kinds of furnaces are as follows : charcoal, 271 ; anthracite coal, 226 ; bituminous coal, 218. The two latter are of course the most important, both in build and capacity, the charcoal furnaces being for the most part primitive and small ; but, on the other hand, their number is so considerable, that a large proportion of the iron production of the States is from them. Thus, in 1876, there were :—

990,000 tons of pig iron smelted with bituminous coal and coke.			
749,578	“	“	anthracite.
308,649	“	“	charcoal.

Notwithstanding the value of the anthracite beds in Pennsylvania, competition is gradually driving the iron trade from these districts to the bituminous deposits, where the coals and the ores associated with them are cheaper. In the Lehigh Valley alone there are fifty-one anthracite furnaces, and many of the Pennsylvanian works, both for iron and steel, rank amongst the most complete in the world, such as those of the Cambria Company, at Johnstown (between Pittsburg and Harrisburg), which turn out 80,000 tons of steel and iron rails per annum. The works at Bethlehem (fifty miles west of Philadelphia) are pre-eminent for their completeness, and especially in connection with the Bessemer steel process. Pittsburg itself (population 156,381) is a second Birmingham, and the centre of the iron trade of the New World. Amongst other adjuncts of the trade, it contains 33 large rolling mills, with a productive capacity of 400,000 tons, equal to one-eighth of that of the whole of the States. In New York State, Buffalo and Troy are the chief iron centres, the latter town containing the large Bessemer works of the Albany and Rensselaer Company.

Ohio has recently come to the fore as a (bituminous) iron producer. Upwards of thirteen new furnaces of the most approved height and construction, have been erected in the counties of Athens, Hocking, and Perry, where valuable beds of coal and ore exist. There are large works in Illinois, at Joliet and North Chicago, turning out some 50,000 tons a year, while in the adjoining State of Missouri there are furnaces at Carondelet, and large steel works (the

Vulcan) at St. Louis. It is, however, mostly in the Bessemer steel that the greatest advance has been made, not so much, perhaps, in the nature of the works, as in their completeness and scientific arrangement. There are now in the districts between Troy and St. Louis (that is, from New York to Missouri) eleven Bessemer mills with twenty-two converters, with a capacity of production of 550,000 ingots of steel per annum. The advantage possessed by the American steel makers is, that they have been able to profit by the experience of the English and Swedish nations, and to begin their Bessemer trade, as it were, full grown.

As regards the production of iron, it must be remembered that the wages of ironworkers in the United States are a good deal higher than those of England; but on the other hand, the cost of living and provisions is much higher also, and it is a serious question for the consideration of those who think of emigrating from the Old World to the New, whether they will benefit themselves by so doing.

The various manufactories of wrought iron are widely distributed throughout the States. Bar iron is produced in twenty-four States, to the amount of nearly three-quarters of a million tons. There are 220 bar and hoop iron mills, of which Pennsylvania again heads the list with 84. Plate and sheet iron are manufactured in fifteen States, though none is made south of Kentucky or west of Missouri. Pennsylvania turns out more plate and sheet iron than any State, producing in fact more than 60 per cent. of the entire quantity made in the Union.

MINING INDUSTRIES—PRECIOUS METALS AND QUICKSILVER.

It is given to very few countries in the world to be producers of gold and silver on a large scale; but in this respect nature has been so bountiful to the United States, that the mining industries arising from these valuable metals are equalled in no other localities at the present date. The enormous riches contained under the head of gold alone in the States may be imagined, from the fact that the yield of 1879 was \$38,900,000 (see equivalents of money, p. 220), and of silver, \$40,812,000; total, \$79,712,000; and that the amount of metals deposited at the mints and assay offices up to that date had reached the gigantic sum of \$1,238,387,536.

GOLD and SILVER, which we must take together, are found in the following States :—California, Nevada, Colorado, Montana, Dakota, Idaho, Oregon, Arizona, Utah, New Mexico, Washington Territory, Michigan, North Carolina, Georgia, Alabama, and Tennessee. It will be readily seen that the gold and silver-bearing districts are mainly found in the Western States, and especially those through which run the great chains of the Rocky Mountains, and thence slope towards the Pacific coast. As, however, the supply of gold, previous to 1846, came almost entirely from two or three of the Southern States, viz., Carolina, Georgia, Alabama and Tennessee, it will be well to notice these districts first. The North Carolina gold discoveries date from 1824, the gold field occupying an area of about 12,000 square miles, and the principal

mines being found upon a belt of granite which runs across the State, near the towns of Queensboro' and Charlotte. There are about 140 mines, more or less developed; but as they have been worked in a very desultory manner, quite different from the scientific undertakings in the Western States, the production of North Carolina and the adjoining States has always been fluctuating. Nevertheless, the total yield of these States up to 1879 has been considerable, viz., Alabama, \$219,120; Georgia, \$7,608,250; North Carolina, \$10,527,691; South Carolina, \$1,389,983; Tennessee, \$82,267; Virginia, \$1,663,345. The gold field of the latter State is a continuation of the Appalachian gold field, which extends from the north of the Potomac into Alabama, the width of the belt, where it is crossed by the Rappahannock River, being about twelve miles. The ores are very plentiful, though not of the richest quality, and the mines, chiefly situated in Fauquier County, are worked with considerable energy.

The gold districts of the Western States date their discovery from as short a time back as 1848, California being the first, succeeded by Nevada, and within the last half-dozen years by Arizona, Dakota, New Mexico, Colorado, and Oregon. The following table gives the yield of the Western States in 1879, for both gold and silver:—

		Gold.	Silver.
California	...	\$17,600,000	\$1,373,703
Nevada ...	...	9,000,000	67,019,788
Colorado	...	3,225,000	18,926,099
Montana...	...	2,500,000	3,108,401

		Gold.	Silver.
Dakota ...	...	2,420,000	—
Idaho ...	...	1,200,000	624,295
Oregon ...	...	1,150,000	3,232
Arizona ...	...	800,000	1,125,394
Utah ...	...	575,000	8,409,253
New Mexico ...	...	125,000	1,796,517
Washington Territory		75,000	—
Wyoming ...	...	—	11,793
Nebraska ...	...	—	749,730

The Californian gold field, which extends over seven degrees of latitude, covering with its longest axis a distance of 500 miles, includes an area larger than the State of New York. The mines of California, Oregon, and Nevada are more or less situated on the ranges of the Sierra Nevada and the Cascade, the principal Californian mines being in the counties of Yuba, Nevada, Calaveras, Sierra, Butte, Shaster, Placer and Inyo. Perhaps the most famous of all the American mines, and indeed we may say of the world, are in Nevada, near Virginia City, which stands 1,500 feet above the Carson Plain. The mountains here are traversed by a wonderful vein or lode, excessively rich in gold and silver. It is called the Comstock Lode, and it is worked in the most complete and scientific manner at about nine large mines, the deepest and hottest in the world. Some of these mines, such as the Consolidated Virginia and the California, are fabulously rich in ore, and have been the cause of intense speculation. A few of these "bonanzas," as they are called, have realized for their owners, fortunes which read more like an Arabian Nights' tale than anything else. Indeed, the two

mines just named produced, in four or five years, precious metal to the amount of \$104,000,000! The entire yield of the Comstock Lode from 1858, when it was first worked, to the end of 1878, was \$291,171,605, to which must be added the "tailings" or refuse, bringing the total to \$323,673,605. The ramifications of the mines extend for 200 miles in aggregate length, and are drained by an enormous tunnel called the Sutro tunnel, but for which they would have been unworkable several years ago.

The Colorado silver mines are extraordinarily rich, and both from their position and rapid development are very remarkable. Leadville, on the Arkansas River, the chief mining centre, is placed at a height of 10,000 feet amongst the mountains, and has grown up with mushroom celerity. One of the most wonderful features of American life is this quick growth of towns, and especially those which are dependent on mining industries. In the Western States are many instances of places which have sprung up in a desert, and in a year or two's time appear full grown, with large and busy populations. It will be seen that by far the greatest part of the American silver supply comes from the States of Nevada and Colorado, amounting in 1879 to \$85,945,887. Arizona is fast coming to the front as a great silver producer, some of the mountains in that State being of marvellous richness. A ton of rock from the Jackson Stonewall mine yielded \$15,000 worth. The only yield of silver in any quantity from other States is that of Michigan, which contributed \$180,000 worth from the neighbourhood of Lake Superior.

The precious metals obtained from the Western States mines are for the most part shipped at San Francisco, in California, in the shape of gold and silver bars, gold and silver coin, gold dust, Mexican, Peruvian, and American dollars. In 1878 the value of these shipments was \$6,857,480, their destinations being the Eastern ports of the Union, England, China, Hamburg, Calcutta, etc.

Comparing the production of gold and silver throughout the world, the annual average yield of the United States is estimated at \$83,000,000; of Australia, at \$29,000,000; of Russia, at \$18,000,000; of Central America, at \$27,000,000; of South America, at \$27,000,000.

QUICKSILVER is a very important article of production from the States of California and Nevada, where it is found in the shape of cinnabar or ore of quicksilver, in association with sulphur or borax. There are over twenty mines, of which some are exceptionally valuable. The New Almaden mine is situated on the Sierra de Santa Cruz, a little to the south of San Francisco, and has been so productive that it has quite driven the Spanish mines out of the market. The yield of this one locality is about 20,000 flasks (of 75 lbs. each), and of the total quicksilver district from 75,000 to 80,000 flasks. It is, however, a fluctuating metal as an article of commerce, as shown by the fact that England imported in 1875 about $3\frac{1}{4}$ million lbs., valued at £670,000, whereas in 1877 the quantity imported was $3\frac{1}{2}$ million lbs., and the value only £363,000. Most of the workmen in the quicksilver mines are Chinamen, who indeed are

universally found throughout the gold and silver mining districts, and particularly in those where operations on a large scale have been carried on and the ground is supposed to be nearly exhausted.

The Chinese have such an unflinching fund of patience and perseverance, that they generally succeed in making a living where the white man cannot.

COPPER, LEAD, ZINC, AND PETROLEUM.

AFTER the marvellous resources of the United States in precious metals, it would be surprising if we were to find a deficiency in metals of less value.

COPPER is one of the most plentiful of these, although, considering the immense area of the country, it is developed (or at all events worked) in comparatively few States. These are Michigan, Arizona, North Carolina, Virginia, Maryland, Pennsylvania, Vermont, Tennessee, Nevada, California, Maine, New Jersey, and Connecticut. Michigan possesses the lion's share, her copper mines being said to be the richest in the world, with the exception of those of Chili. The copper region occupies a tract of about 135 miles long, and from one to six broad, along the southern shores of Lake Superior, and the 27 mines opened here produce 83 per cent. of the whole yield of the States. These deposits were worked in

very ancient times by the Indians, but the date of the advent of the white men was about 1848. The annual yield of the Michigan mines varies a good deal, copper being a fluctuating article of commerce; but they have been steadily worked for several years past, and the production may be estimated at nearly 24,000 tons of ore, yielding some 20,000 tons of copper ingot. Some of the mines are very rich, the Calumet and Hecla mines in 1872 having yielded 8,000 tons of fine copper, while a single sheet of copper was found in the Minnesota mine weighing at least 250 tons.

In Virginia and the adjoining State of North Carolina there are three valuable copper lodes, called respectively the Northern, Middle or Peach Bottom, and Southern or Ore Knob Lodes, and in the latter State these lodes have been exceedingly productive. In the Eastern States copper is found, but not now worked, in Connecticut, at Sunbury, the abandoned shafts having been turned to good account at one time as a State prison; in New Jersey, and Maine, where, near the sea coast, a rich belt has been discovered recently. In Tennessee there are large mines at Ducktown, Polk Co., together with every appliance for smelting on the spot. Latterly valuable deposits have been worked on the Pacific Coast near San Francisco.

LEAD ore is extensively scattered over the States, being found in Connecticut, New Hampshire, New York, Pennsylvania, Virginia, Tennessee, North Carolina, Kentucky, Iowa, Illinois, Wisconsin, Missouri, Utah, California, Colorado, and Nevada. Until the recent discoveries in the four last-named States, the

most extensive lead deposits were in the upper valley of the Mississippi, a region of 4,000 square miles, lying in Wisconsin, Illinois, and Iowa ; but the yield has fallen off of late years. The Missouri mines, especially those of Shibboleth and La Motte, have, in times gone by, yielded largely. The Virginian lead mines in Wythe County are rich, but have not been worked vigorously. The New Hampshire lead mines yield silver to a considerable extent, that of Shelburne giving 84 ounces to the ton of lead. But, as with the other metals, the Pacific States have quite surpassed the older lead districts. The deposits at Leadville, Colorado, are exceedingly rich in silver, the average yield being from 100 to 150 ounces per ton. Most of the lead from Utah, Colorado, Nevada, and Montana is taken to Pittsburg to be smelted. The total amount of lead produced in 1878 in the United States was 81,500 tons.

ZINC ores are worked principally in Pennsylvania, New Jersey, Missouri, North Carolina, Arkansas, Wisconsin, and Tennessee. Those of New Jersey and Pennsylvania are perhaps the richest in the States, a block having been exhibited in the Exhibition of 1851 weighing 16,400 lbs. Franklin and Sparta (N. J.) are the chief zinc producing localities, and it is also obtained largely from the Lehigh Valley, Pennsylvania. Here, too (near Bethlehem), are large zinc smelting works ; but the great bulk of the trade is carried on in the Passaic district (New Jersey), and at La Salle in Illinois.

The PETROLEUM industry is one that has assumed enormous magnitude, and until very recently was

almost peculiar to America ; but Russia, Austria, and Germany are now commencing to compete with her in this article. Petroleum, or rock oil, forms another of those subterranean sources of wealth which America possesses so lavishly. Until the year 1857 this valuable material was known by the name of Seneca oil, and used only as embrocation for bruises, while its yearly production was but 16 barrels ; but in that year its illuminating powers became known, and the first oil well was sunk in 1859, at Titusville, Pennsylvania. The production rapidly increased to a fabulous extent, so much so that in 1873 it reached a daily yield of 21,568 barrels of 40 gallons each, or annually 7,878,629 barrels. Huge fortunes have been made (and occasionally lost) in petroleum speculations, for the supplies are not always constant, and a well which has up to a certain point yielded profusely, may suddenly become dry. Pennsylvania has been the chief source of petroleum, next to which come Illinois and Missouri, followed in a less degree by New York, West Virginia, Ohio, Kentucky, Tennessee, and Indiana. Large populations have grown up in the oil regions round Petrolia, and busy towns, such as Millertown, Oil City, Pithole, and Titusville ; but they are not to be recommended as places of residence, partly from the nature of the pervading industry, and partly because an oil city is liable to be destroyed by fire in a few minutes' time. There are also wells at Pico and San Fernando, in South California. The magnitude of the petroleum operations may be imagined by the fact that some of the wells are 1,500 feet deep, and that when the oil arrives at the surface, it is conveyed to

cities like Cleveland, Pittsburg, and New York, the three great centres of oil refining, whence it is taken to the shipping ports for exportation. The cost of carriage of the oil from the wells is greatly minimized by the construction of long conduit pipes, the one from Millertown to Pittsburg being thirty-six miles in length. The average production throughout the States at present is about 35,000 barrels per day.

TEXTILES.

IF there is one thing more than another which shows the intimate relations of countries with each other, it is the growth of COTTON in the United States, and the dependence of Great Britain upon this growth for at least three-fourths of the supply for her cotton manufactures. During the Civil War in America, Lancashire was nearly starving from the failure of these supplies, and it should be, therefore, a matter of the greatest interest to English people to understand to the full the vast importance of this branch of American produce. Amongst the many varieties of the cotton (*gossypium*) plant, which now furnish from different countries the staple from which are spun our yarns, those that form the bulk of American cottons are known in the language of botanists as *G. Barbadosense* and *G. Hirsutum*; in other words, the smooth and hairy leaved kinds. For commercial excellence, the

finest cottons in the world are of these kinds, which are grown principally in the Southern States, and are known as Sea Island and New Orleans cottons respectively. The Sea Island was first cultivated in America at the close of the last century, and obtained its name, because it was found to grow with great luxuriance in the belt of islands lying alongside the coast of Georgia, North Carolina, and Florida, where the soft maritime, frostless climate is admirably adapted to it, and where it grows, surpassing all others in the strength, length, and beauty of staple.

The Orleans cottons are generally known under the name of Middling Uplands, and are of a shorter staple. They are grown more inland, and are used for almost all kinds of cotton manufactures, as well as for mixing with more specific varieties.

About 12 million acres are planted with the cotton crop, and the average annual yield is from 4 to 5 million bales, the net weight of each bale being 440 lbs. Like all other agricultural crops, that of cotton is dependent on many circumstances of weather, but we may take the yield of 1876, or 4,669,288 bales, and that of 1879, or 5,073,531 bales, as fair average crops. Dependent as it is so greatly on climate, we naturally find it limited to certain of the Southern States, viz., Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. The chief source of the cotton crop is Louisiana, which, with Mississippi and Arkansas, and the country drained by the Mississippi southward towards New Orleans, raised in 1879 about 1,187,365 bales. The next most prolific region is

that which finds its outlet southward through the Mississippi valley, mainly Tennessee, Alabama, etc., which produced 832,710 bales. The yield of Texas was 584,097 bales ; of South Carolina, 599,032 ; and of Virginia, 561,468 bales. The principal shipping ports for the export of cotton are New Orleans, Savannah, New York, Charleston, Galveston, Norfolk, Boston, and Mobile ; but it is noteworthy, that owing to the development of railways in the Southern States, those ports, such as Galveston and Savannah, are becoming busy cotton centres at the expense of the Northern ports, such as New York. Of the 5 million bales of cotton raised during 1879 in America, 184,945 were consumed in the cotton manufactures in the South, 431,842 were sent to the Northern cotton mills, and 4½ millions were exported ; and of these last Great Britain took the lion's share.

It might reasonably be expected that as the cotton crop is essentially a Southern one, the bulk of the cotton manufactures would be found in the same States ; but it is not so, the Northern States containing the great majority of the cotton mills. The reason of this has been, that the formation of the country, with rapid streams issuing from the hills, is more favourable to the providing of water-power than the slow, sluggish rivers of the South, added to which the conditions of the atmosphere in the North are also better suited to cotton spinning. Still there are mills and factories in the South, though only 181 to 694 in the North. Of the latter, the cotton manufacturing States come in the following order according to the number of mills : Massachusetts, Rhode Island, Con-

necticut, New York, Pennsylvania, New Hampshire, Maine, New Jersey, Maryland, Vermont, Delaware, Ohio, and Indiana; of the former, Georgia, Tennessee, North Carolina, South Carolina, Alabama, Mississippi, Virginia, Missouri, Kentucky, Louisiana, Arkansas, and Texas. The number of spindles in all these American mills is 9,539,364 (Great Britain contains $39\frac{1}{2}$ millions, and France $4\frac{1}{2}$ millions), and the quantity of cotton consumed in them is 576,742,753 lbs. At least three-fourths of the spindles are to be found in the six New England States, and of these Massachusetts is *par excellence* the Lancashire of America, possessing 206 factories and nearly 4 million spindles. The principal of the cotton spinning towns are Lowell, Fall River, and Lawrence, all in Massachusetts; Providence, in Rhode Island; and Cohoes, in New York. Take Lowell, which is situated on the Merrimack river, as an example of an American factory town, and we shall find that it contains a population of 60,000, all dependent on the cotton, woollen, hosiery, carpeting, and shawl manufactories carried on in some 88 mills, with about 800,000 spindles, and 18,000 looms. Cohoes is on the Mohawk river, and is another great seat of the cotton and woollen hosiery trade. The Harmony Mills here consume annually 30,000 bales of cotton, produce 80 million yards of cloth and cotton goods, and employ 4,000 operatives, so that it will be seen on what a large scale the industrial manufactures are carried on in these States. The American cotton factory towns are not the same dreary, ugly places as those in Great Britain. The mills themselves are hand-

some and well built; the towns bright, clean, and cheerful; while the character of the operatives stands very high for smartness of appearance, superior education and general respectability. The large trading corporations which for the most part own the American mills, take great delight in providing ample and good accommodation for their workpeople, with excellent results; the squalor, poverty, ignorance, and depressing appearance of an English factory town being entirely unknown in the United States. There is no restriction of labour, and the average working day is 11 hours in length, but in some of the States it is only 10 hours, as each State makes its own laws and regulations in these matters.

Though the cotton manufacture in the Southern States is very far behind that of the Northern ones in importance, the mills there are increasing, and it is likely that the trade will, to a considerable extent, gradually migrate to the localities where the cotton is grown. The recent introduction of a machine called the Clements machine, which saves an immense deal of trouble and expense in the preliminary processes of cleaning and ginning cotton, will probably help very much to the increase of spinning factories in the South.

The WOOLLEN manufactories of the States are more generally scattered throughout the country than those of cotton, there being woollen mills in at least thirty-eight States. At the same time, there is no special district affected by the woollen trade, as in Yorkshire, woollen and cotton mills being found alike in most of the textile towns. Massachusetts is again the headquarters of the manufacture, followed by Pennsylvania,

New York, Connecticut, Rhode Island, New Hampshire, and Maine. There has been also a remarkable increase in this textile in some of the States west of the Alleghanies, such as Iowa, Missouri, Kansas, Minnesota, Oregon, etc. The total number of woollen mills and factories in the States is over 3,000, containing 14,000 broad and 20,000 narrow looms, with 1,900,000 spindles, and employing over 80,000 hands. The consumption of wool in America is large, but it is mainly furnished by flocks of home growth. The States which produce the best wool and in the largest proportions are Ohio, Pennsylvania, Virginia, Illinois, Iowa, Indiana, Missouri, Wisconsin, California, Texas, Michigan, New York, and Vermont. The cities of Boston, Philadelphia, and New York may be considered as the head-quarters of the woollen trade, as far as business is concerned.

New Hampshire, which is specially celebrated for its flannels and blanketings, stands also at the head of the list in the worsted manufacture, Manchester and Concord being its chief factory towns; the other States in which this branch of the woollens is carried on being Rhode Island, Pennsylvania, Connecticut, Massachusetts, New Jersey, Ohio, and Wisconsin. A very large and increasing carpet trade is also to be found in most of the same States; Pennsylvania, and especially Philadelphia, manufacturing Kidderminsters and Venetians, Massachusetts making most of the Brussels and tapestry carpets, while New York has almost a monopoly in felt carpets. Philadelphia is noted for the number of its hand-loom carpet weavers. There is also a very large production of knitted woollen

goods, such as woven under-shirts, stockings, etc., of which Cohoes, in New York State, is the chief centre. There are some 20 mills here, producing annually nearly 3 million dollars' worth of this class of goods.

The SILK trade of the United States does not in any way equal that of cotton or wool in importance, though it has within the last few years greatly increased. There are about 150 silk mills of different kinds spread about in the States of New York, New Jersey, Connecticut, Massachusetts, and Pennsylvania, employing some 14,000 operatives; but the chief silk towns at present are Paterson (New Jersey), situated on the Passaic river, Northampton (Massachusetts), Hartford and South Manchester (Connecticut). In 1876 the amount of silk consumed in the New England factories was 1,284,860 lbs., while the product in the shape of sewing silk and silk goods amounted in value to nearly 27 million dollars.

The FLAX and JUTE manufactures are but of small importance, flax growing not being carried on in America to any great extent. Ohio and Illinois are the principal producers, but this class of manufactures is mainly limited to coarse goods, such as bagging, rope, twine, and tow. What there is made of fine quality, such as crashes and linen goods, is principally in Massachusetts and New York. The jute trade is very much in the same position, most of the jute mills being in New Jersey and Pennsylvania, in which latter State the manufacture of jute carpets is noteworthy. Jute has been grown with success in the southern States of Georgia, Louisiana, and Florida.

AGRICULTURE.

It is a matter of difficulty to describe a continent so vast as America in all its agricultural bearings ; and it will perhaps be best, therefore, to note the characteristics of each State or Territory as they occur in alphabetical order, all the figures being taken from the census of 1870.

Alabama—area, 14,961,178 acres,* is a moderately fertile State, with a large percentage of the population engaged in tilling the soil. Its productions are Indian corn or maize, wheat, oats, rye, cotton, rice, sugar, and potatoes. The average size of the farms is 222 acres.

Arkansas—area, 7,597,296 acres, possesses some vast alluvial lands, remarkable for fertility ; but in other places the soil is poor, and the climate is exceedingly changeable. The bulk of the population is agricultural, and the productions are maize, wheat, oats, rye, rice, sugar, tobacco, potatoes, and hay. Average of farms, 154 acres.

Arizona—area, 21,807 acres, can scarcely be called an agricultural State, though the value of production per acre is greater than that of any of the Atlantic States except New Jersey. Its chief products are maize, wheat, barley, and fruits, such as figs, oranges, and lemons. Average size of farms, 127 acres.

California—area, 11,427,105 acres, contains some of the richest land in the world, and can grow almost

* These figures do not represent the total area of the State, but only of cultivated land.

everything. Its products are wheat, barley, maize, oats, cotton, tobacco, rice, hops, hemp, tea, coffee, wine, olive, and fruits of every kind; and the average size of the farms is 482 acres.

Colorado—area, 320,346 acres, has some good grazing lands, but the greater portion is unprofitable for cultivation. The products are wheat, maize, oats, and barley, which thrive at an elevation of 7,500 feet. The average size of farms is 184 acres.

Connecticut—area, 2,364,416 acres, grows maize, oats, rye, buckwheat, wheat, barley, tobacco, and hay, while it furnishes great quantities of milk for the New York market. The valley of the Connecticut river has the richest land in New England. The average size of the farms is small, only 93 acres.

Dakota—area, 302,376 acres, is very well adapted for cereals, the ordinary yield of wheat being 30 bushels to the acre, although of such natural fertility is some of the land, and especially that of the Red River Valley, which divides Dakota from Minnesota (p. 42) that upwards of 70 bushels of Indian corn to the acre have been grown. Its products are wheat, maize, and oats, and the farms average 176 acres.

Delaware—area, 1,052,322 acres, cultivates maize, wheat, and oats, together with fruit, immense quantities of which are sent to the New York market. From 3 to 4 million baskets of peaches are shipped annually, and the yield of strawberries in 1874 was 7,470,400 quarts. Average size of farms, 138 acres.

Florida—area, 2,373,351 acres, possesses great quantities of swamp land, fit for the production of tropical crops. Wheat is very little grown, but a considerable

amount of maize, oats, cotton, tobacco and indigo. Florida is also one of the chief market gardens for New York and Philadelphia. Farms average 232 acres.

Georgia—area, 23,647,941 acres, is somewhat of the same character as Florida, the chief crops being maize, wheat, oats, cotton (in the production of which it is the second State), tobacco and rice. Average size of farms, 338 acres.

Idaho—area, 77,139 acres, has only about one-third suited for agriculture. Oats, wheat and barley are its chief cereals. Size of farms, 186 acres.

Illinois—area, 25,882,861 acres, is one of the most fertile grain producers in America, in 1873 being the first in the production of maize (56 bushels to every inhabitant) and oats. It also grows large quantities of wheat, besides barley, rye, flax, tobacco, hay, and produces extensively in garden and orchard yield and honey. The average size of farms is 128 acres, but some are of enormous extent, one farm in Ford County containing 40,000 acres.

Indiana—area, 18,119,648 acres, ranks fifth in the States as to farm produce, and in the yield of maize and wheat. Oats, rye, tobacco, vegetables, and great quantities of fruit are also grown. Average of farms, 112 acres.

Iowa—area, 15,541,793 acres, has a less acreage of barren land than any other State, and in 1873 was first in the production of wheat, second in maize, and third in barley and oats. Maize, indeed, is often so abundant, that it is burnt for fuel. Farms average 134 acres.

Kansas—area, 5,656,879 acres, is a State of great

fertility and with an excellent climate, though the variations of temperature are sudden and great. It produces maize, wheat, oats, hay, potatoes and tobacco, and in 1873 the average yield of maize was 39 bushels to the acre, greater than that of any other State except California. The average of farms, 138 acres; though many are of great size, and it must be remembered that while the area under cultivation is comparatively small, there are millions of acres waiting to be utilized as soon as sufficient population and means of transport are provided.

Kentucky—area, 18,660,106 acres, is a large grower of maize, and a moderate one of wheat, oats and rye, while its great staple is tobacco, of which it produces more than any other State. Hemp, too, is much grown. Average size of farms, 158 acres.

Louisiana—area, 7,025,817 acres, grows some maize, oats and wheat, but only in a small proportion to its industrial crops, which are cotton, sugar-cane and rice. Farms average 248 acres.

Maine—area, 5,838,058 acres, while producing maize and oats, vegetables, fruit (especially apples), maple sugar, and a considerable quantity of hay, is also a dairy farming State, and devotes much attention to the rearing of horses for the New York market. Average of farms, 98 acres.

Maryland—area, 4,512,579 acres, is by no means one of the leading agricultural States, except in the crop of tobacco, in which it ranks fifth. It produces, however, fair quantities of maize, wheat, oats and sweet potatoes. Size of farms, 167 acres.

Massachusetts—area, 2,730,283 acres, grows maize

as its principal cereal, and is a market gardening State ; but the fact that only 72,810 people out of the 579,844 in the whole State are engaged in agriculture, shows that Massachusetts finds more profit in attending to her manufactures. Average of farms, 103 acres.

Michigan—area, 10,019,142 acres, has a good deal of fertile land, but more that is cold and unprofitable, with a rather severe climate. Nevertheless, Michigan grows large quantities of wheat, maize and oats, together with much fruit, particularly apples, pears and grapes, the orchard value of the State ranking much higher than could have been expected from its northerly situation. Average size of farms, 101 acres.

Minnesota—area, 6,483,828 acres, stands very high in its production of wheat, oats and maize. The enormous increase of the wheat yield in this State, which includes the famous Red River Valley, may be gathered from the fact that in 1850 only 1,400 bushels were grown, while in 1870 this had risen to 18,866,073 bushels. The average of the farms is 139 acres, but some of them in the Red River Valley are of gigantic extent ; one in particular is mentioned as occupying 30 square miles. In 1878 an area of 20,900 acres was planted with wheat, the yield being 250,000 bushels. This district, which is is about 400 miles in length by 70 in breadth, may be said to be the richest wheat-growing land in the world.

Mississippi—area, 13,121,113 acres, has maize for its chief cereal, but its staple productions are cotton,

in which it ranks first in the States, rice, and sweet potatoes. Average size of farms, 193 acres.

Missouri—area, 21,707,220 acres, is a very productive agricultural State, growing quantities of maize, wheat, and oats, together with cotton, flax and tobacco. Size of farms, 215 acres.

Montana—area, 139,537 acres, contains large sterile plains, though many of the valleys are extremely fertile. Wheat and vegetables are the principal productions, and the average of the farms is 164 acres.

Nebraska—area, 2,073,781 acres, grows wheat, maize and oats, and is specially noted for its vegetables and fruits, which find a ready market at St. Louis. Average of farms, 169 acres.

Nevada—area, 208,510 acres, devotes more attention to mining than to agriculture, though there are some fertile valleys in the west. Barley and wheat are the chief cereals. Size of farms, 201 acres.

New Hampshire—area, 3,605,994 acres, has a somewhat rigorous climate, and busies itself more with manufactures. Maize and oats are grown, and a good deal of maple sugar is produced. Average of farms, 169 acres.

New Jersey—area, 2,989,511 acres, yields a considerable supply of maize and oats, but its specialty consists in market gardening for New York and Philadelphia, and in the value of which it stands second of the States. Cranberries are largely grown here. Average of farms, 98 acres.

New Mexico—area, 833,549 acres, although containing some fertile land, requires too much irrigation

to make it very productive in cereals. The average of farms is 136 acres, though there are several of over 1000.

New York—area, 22,190,810 acres, occupies a very foremost place in agriculture, growing great quantities of oats, maize, wheat, barley, buckwheat and rye. In the western districts market gardening is extensively carried on, and dairy farming in the northern and southern counties. Average of farms, 103 acres.

North Carolina—area, 19,835,410 acres, has maize for its chief cereal, though its semi-tropical climate suits better for cotton, rice, tobacco, sugarcane and sweet potatoes. Pea- or ground-nuts are raised in immense numbers for exportation. Average size of farms, 212 acres.

Ohio—area, 21,712,420 acres, is a great grazing country and large grain producer, maize, wheat and oats being the chief cereals. Fruit is also abundant, the apple crop in 1872 yielding 23 million bushels, and the peach crop 405,619 bushels. Average of farms, 111 acres.

Oregon—area, 2,389,252 acres, is more of a stock-raising and dairy-farming country, though producing maize with a very large yield to the acre. Average of farms, 315 acres.

Pennsylvania—area, 17,994,200 acres, grows more oats than anything else, followed by maize, wheat and rye. Only about 25 per cent. of the population is engaged in agriculture, the rest principally following coal mining and iron trades. Average of farms, 103

Rhode Island—area, 502,308 acres, besides being of small extent, is so much devoted to manufactures, that it can scarcely be called an agricultural State. The land is better adapted for grazing than tillage, though, from careful culture, it produces considerable crops. Average of farms, 94 acres.

South Carolina—area, 12,105,280 acres, has maize for its chief cereal, though the leading product is rice, together with cotton. Average of farms, 233 acres.

Tennessee—area, 19,581,214 acres, grows great quantities of maize, and a fair amount of wheat and oats. Tobacco, rice and cotton are the other crops, as in the last-named State. Size of farms, 166 acres.

Texas—area, 18,396,523 acres, is abundant in maize, but scarcely suitable for other cereals. Cotton is an important product, as also rice and sugar-cane, and many semi-tropical fruits flourish here. Average of farms, 310 acres.

Utah—area, 148,361 acres, cannot be called an agricultural State. Hardly one acre in fifty in its natural state will pay for cultivation, though an extensive system of irrigation has made a garden of the desert about Salt Lake City. Average of farms, 30 acres.

Vermont—area, 4,528,804 acres, grows oats and maize, and is a considerable producer of cheese and maple sugar. The farms average 134 acres.

Virginia—area, 18,145,911 acres, yields maize, wheat and oats, but the great staple is tobacco, in which it ranks second of the States. Average of farms, 246 acres.

Washington—area, 649,139 acres, grows wheat and oats, but the scanty rainfall makes large tracts sterile. It is a good country, however, for stock raising. Average of farms, 208 acres.

West Virginia—area, 8,528,394 acres, is a fairly productive State yielding maize, wheat and oats. Average of farms, 214 acres.

Wisconsin—Area, 11,715,321 acres, grows large quantities of wheat, oats and maize. Average of farms, 214 acres.

Wyoming—area 4,341 acres, has so much barren and elevated plateau land, that it scarcely figures at all in agriculture. The average of farms is but 25 acres.

We may sum up the annual average yield of the States in the following table:—

	Area	Yield in bushels	Yield per acre
Maize or Indian corn	1,500,805	1,115,595,625	267
Wheat	25,901,694	251,743,612	12
Oats	12,005,107	295,883,990	27.9

Maize commonly spoken of as "corn," is a crop of enormous importance of the value of some \$100,000,000 per annum, and is one of the principal crops of American food, it being used in a variety of ways. It is improved in increasing quantities of the land for corn flour, also for brewing and distilling purposes.

It is not only a surplus of wheat to dispose of, it is a surplus that the United States has become the granary of the world, and that they should be the granary of the world, rather than England and other European countries and back to feed their redundant

populations. In 1878 the export of cereals alone reached \$181,777,000. England alone imported 36 millions cwts. of wheat from America in 1879, and the yearly demand, as well as the yearly supply, seems more likely to increase than to diminish. The conditions of American agriculture are not only of vast interest to that country but also to the inhabitants of about six-tenths of the civilized world.

THE PROVISION TRADE

WE have seen how great are the resources of the United States in providing cereals for the population at home, as well as for a large proportion of the European countries. Indian corn and wheat, however, are not the only food supplies for which America is famous; and if she may be called the granary of the world, she may with equal justice be looked upon as the larder of England, so enormous and rapidly increasing is the provision trade, with which she is able to meet the demands which Great Britain makes every year. The four great divisions of this trade are pork, flour, dairy produce, and canned foods. The number of live stock in the States in 1878 was as follows :—

Horses	...	...	...	...	10,938,700
Cattle	...	...	...	...	33,234,500
Sheep	...	...	...	...	38,123,800
Pigs	...	...	...	...	34,766,100

Of this vast number of animals, a good proportion is annually exported (in 1878 to the amount of \$5,844,653, of which about 55 per cent. goes to Great Britain and Ireland.) The magnitude of the provision trade is seen principally in such articles as bacon and ham, pork, beef, butter, cheese, lard and preserved meats. Whether the cattle are to come to England alive or dead, they are first of all raised in the stock-feeding regions and prairies extending westward through Nebraska and Wyoming over the fertile Laramie Plains to the Rocky Mountains, and on for a thousand miles farther through Utah, Oregon, and Washington Territories, where is room for more than five times the live stock now raised. These vast American grazing grounds run from the Gulf of Mexico for 1,500 miles or more, over the international boundary line into Canada. Texas rears 5½ million head of cattle ; Colorado has 30 million acres adapted for growth of grain, cattle or sheep. Wyoming has 55,000 square miles of grazing, and the same may be said of Montana. Over these wide areas herds of cattle roam, numbering from 1,000 to 50,000 head, feeding ground being plentiful, and the only necessities to be looked after being a good supply of water and some salt. From the pastures there is, during the summer and autumn, a constant stream of cattle to some of the depôts on the Union and Northern Pacific Railways, to be taken to Chicago, Kansas City, St. Louis, or the Atlantic ports, thence to be conveyed to London, to which place it is computed that the cost of carriage of a bullock from Colorado is from £10 to £12. Great numbers of cattle, however, go no

farther eastward than the Indian-corn regions of Illinois, Wisconsin, Iowa, Minnesota and Missouri, where they are cheaply fattened for killing, some 2,000 carcasses being forwarded every week to British markets. They are shipped at New York, New Jersey, Chicago and Philadelphia to London, Liverpool, or Glasgow, and brought over in fine condition in large refrigerating steamers, each of which carries from 800 to 3,000 quarters. Fresh American meat can thus be sold at British ports at about 6*d.*, per lb. leaving a profit ; but there is little chance of the British consumer getting it at anything like a reasonable price, as long as he is in the hands of the British butcher.

The greatest speciality, however, of the American provision trade is that of hog-packing, which is carried on to an enormous extent at Chicago, Cincinnati and a few smaller cities, the former being the head-quarters of the trade. The great hog-raising States are those which produce the most maize or Indian corn, and the bulk of the hog-packing is carried on in the winter, although of recent years there has been a summer business also at Chicago. In this city alone the number of hogs killed and converted into pork in 1878 was 4,009,311. The operation of killing and packing is done with such celerity as to be almost magical, it being commonly stated that a hog enters at one end of the establishment and emerges in a few minutes packed in a barrel. One firm in Chicago packs during the year 140,000 tons of hogs, enough to afford 45 freight loads daily ; and to accommodate the continual stream of animals which arrive in the city, stockyards have been constructed which cover

350 acres and will hold 118,000 at a time, upwards of 7 million hogs annually passing through them. The chief centres of the pork-packing trade are Chicago (Illinois), Cincinnati (Ohio), Kansas City, St. Joseph and Hannibal (Missouri).

The trade in canned provisions is also very large and rapidly increasing. Chicago is one of the leading places for making tinned beef, one firm putting up daily 40,000 to 50,000 cans, in tins made on the premises, holding 2lbs. to 28lbs. each. Three hundred beasts are killed and dressed in the day here, while the St. Louis Beef Canning Co. (Missouri) slaughter daily during the season 1,000 cattle. Others besides the Western States are gradually entering the tinned provision trade. On the Pacific side, the State of Oregon is largely embarking in it, and great quantities of tinned beef, mutton, and salmon from the Columbia River, are prepared at Portland, the capital, for exportation. The Eastern States, and especially those of New England, carry on large industries in canning fish, oysters, vegetables and fruit, and we in England are indebted to America for many of these cheap and appetizing delicacies.

Cheese is another article of which the production and export are almost fabulous in extent, cheesemaking being carried on by the co-operative factory system, that is, the combination of a number of farmers to supply milk to a certain factory, each one sharing in the expense and the profits. In 1874 New York State had 1,139 of these cheese factories, at which 23,000 farmers delivered the daily milk of 308,352 cows; but at the present time it is estimated that

over 30,000 farms are laid under contribution for these supplies. At Little Falls (New York) more than 25,000,000 lbs. of cheese from the factories annually change hands, and still more at the town of Utica. In 1878 the American cheese exports amounted to 134,000,000 lbs.

Mention has been made in the preceding chapter of the grain that is grown in the different States. In addition to the capital and industry involved in this, the milling or "flouring" interests are of immense importance. There is scarce a town of any size, especially if it possess water power, that does not contain, more or less, large flour or grist mills, while in some of the States the preparation of flour for export is on a huge scale. The State of Minnesota is one of the busiest in this direction, being almost entirely occupied with milling and timber cutting. There are in this State 405 flour mills, of which 105 are run by steam and the remainder by water power. When working at their full capacity, these mills, which are principally at Minneapolis and St. Paul's, will produce 111,167,550 barrels of flour, consuming in the process 55,837,500 bushels. In connection with the export of flour and grain, it should be mentioned that a vast industry is caused in the matter simply of loading and forwarding. Chicago is again the leader in this branch of business, and the warehouses for storing, and the elevators for loading and unloading, are on a gigantic scale.

Sugar is an article of considerable importance as an American staple, though its growth and manufacture is almost entirely limited to one State, that of Louisiana, which possesses, in the delta of the Missis-

issippi, an area of 200 miles long by 100 broad, the finest land possible for the product of cane sugar. The yield in 1878 was 213,221 hogsheads, though the cane crop is somewhat fluctuating. In the Northern States, and particularly those which approach the Canadian border, such as the New England States and Michigan, there is a considerable manufacture of sugar from the maple tree; but although the consumption is great, maple sugar is more a branch of domestic industry than a national one. The consumption of sugar in the United States in 1878 was 685,670 tons, and of molasses 43,812,509 gallons, but by far the largest portion of this was imported.

Tobacco, like sugar, is limited to a few of the Southern States as far as the growth and cultivation go, though, the Americans being a nation extraordinarily addicted to smoking and chewing, there is scarce a city of any size which does not include the preparation of tobacco and cigar-making as one of its industries. Kentucky, of which its inhabitants say "that the sun never shone upon a fairer country," is *the* tobacco-raising State, the soil suiting the plant so well that 1,400 lbs. have been produced from a single acre. In 1873 Kentucky yielded 152,000,000 lbs., which is about three times the amount produced by Virginia, the next tobacco-growing State. Before the separation of America from English rule, vast fortunes were made by the cultivation of tobacco, and an interesting description is given of those times and places in Thackeray's novel, "The Virginians."

Salt is an article of considerable abundance in many of the States, particularly the Western ones, as

though nature had provided the great stock-feeding areas with this necessary condiment for man and beast. Arkansas, Michigan, Indiana, and other States, have good supplies from salt springs, while Utah, Nebraska, and Nevada are furnished with inexhaustible salt basins. In the latter State, salt beds extend over 50 square miles in Esmeralda County, with incrustations of pure salt, and in the south-east there are "salt bluffs" 500 feet high, forming a mass of rock-salt 2 miles long and $1\frac{1}{2}$ mile wide. Utah is also a great natural salt basin, the water of the Salt Lake, 100 miles long by 50 wide, being so salt that no fish will live in it.

FORESTS AND THE LUMBER TRADE.

No account of the industrial resources of the United States, however brief, should omit mention of the forests and woods, or of the great trade that is carried on in "lumber," or, in other words, timber. A saw-mill is about the earliest form of manufacturing civilization in the New World, and no community of colonists can begin life without it. The forests of America are so extensive and varied, that the use of wood is carried to a far greater extent than in England, where forests have well-nigh disappeared—and the consequence is that a large industry has grown up all over the States, first in sawing lumber or

the raw material ; and secondly, in producing what may be called manufactured wood for staves, shingles furniture, doors, sashes, axles, and a vast number of unconsidered trifles for farm and domestic use.

The forests differ in their extent, from the amount of clearing to which each State has been subject during the increase of settled population, and in variety according to the nature of the soil and the climate.

Alabama possesses immense forests of yellow pine, and in *Arkansas* the cotton wood is the most common. *California* is not so rich in forests, though it has large growths of various kinds of pines, the size of some of them being on an almost incredible scale. A group called The Big Trees is celebrated throughout the world, the tallest of them being 385 feet high, and 93 feet in circumference. It is believed that the age of these giants must be nearly 2000 years. *Delaware* is noted for its cypress swamp, containing 50,000 acres of valuable timber. *Florida* is considered to be the best timbered State, as far as its forest area of 30,000,000 acres goes, though it is not such a great lumber State as many others. *Iowa* possesses about $3\frac{1}{2}$ million acres of timber, which grows with great rapidity when planted in the prairies. *Maine* is one of the most densely wooded States, possessing more than 21,000 square miles, and some of its northern portion being as unbroken forest as nature made it. What with the wealth of wood and that of water, a great many hands are employed in lumber sawing and shipping. *Michigan* may be considered the typical lumber-land of the States, a great part of the northern peninsula being covered with a

dense growth of timber, in which the pine and other soft trees predominate. Bay City, with its population of 20,693, depends almost entirely on lumber; and the Saginaw Valley, at the end of which it is situated, is said to have yielded, between 1863 and 1878, nine thousand million feet of sawed lumber. The saw-mills are on a most complete scale, the average daily product of one special mill being 205,000 feet of boards, possessing also planing machines capable of dressing 100,000 feet of lumber; a heading machine (for casks) which can turn out 5000 pieces; a stave machine, with a capacity of 50,000 pieces; and a hoop machine, with a capacity of 10,000 pieces. The shipments of lumber from Bay City in 1878 were 525,282,098 ft., more or less, and of shingles, 187,699,380 ft. Most of the Michigan towns flourish by saw-mills or the shipping of lumber—Muskegon, for instance, a small town of only 11,000 inhabitants, shipping annually 300,000,000 ft. of logs. *Minnesota* is another State, one-third of which is covered with timber, 21,000 square miles being included in the pine region. Water power being inexhaustible, we find the lumber trade very prosperous here, 318,509,285 feet of logs having been sawn in one year in the North Mississippi, St. Croix, and Duluth districts.

The importance of the trade may be gathered from the fact that in 1873 it was estimated that there were 25,832 saw-mills and lumber establishments, employing 149,997 hands, and that the annual value of the product was \$210,152,327. More than one-half of this amount was turned out in the States of Michigan, Pennsylvania, New York, Wisconsin, Indiana, and

Maine. The variety of the trade, raw and manufactured, will be understood by the list of exports, which in 1879 consisted of boards, deals, planks, joints, laths, palings, curtain-sticks, broom-handles, shingles, staves, headings, hogsheads, barrels, firewood, hop and telegraph poles, logs, masts, spars, and household furniture of all kinds, to the value of 717 million dollars.

TRAFFIC ROUTES.

LIKE most other things in the United States, the traffic routes, whether by water or rail, are on a large scale, as befits a country, the home business of which ramifies over the greater part of an entire continent. No country in the world has such magnificent natural waterways as America, supplemented as they are by splendid canals; but for all that, the railway system has greatly superseded the water traffic, though business men are beginning to find out that, for bulky goods at all events, the advantages of rivers and canals have not been sufficiently recognised, and a reaction will probably take place in their favour. One of the chief water traffic routes may be called the Canadian water line, as America shares with that Dominion its superb system of lakes and rivers. It should be mentioned, however, that Canada found the money for the construction of works such as the Welland and St. Lawrence canals, without which

this route would have been impracticable. By means of the former the obstacle of Niagara Falls between Lakes Erie and Ontario, is overcome, and a ship can sail direct to Liverpool from Chicago on Lake Michigan; and in like manner the Canadians have constructed six canals on the St. Lawrence, so as to avoid the rapids on that river.

The Erie canal plays a great part in the transport of the traffic between the States and British North America, for, starting from Buffalo just above Niagara, it takes the commerce of Lakes Erie, Huron, and Michigan and conveys it to Albany on the Hudson River, by which means a clear waterway is gained to New York. Several important canals branch from this system, such as the Genesee Valley, the Oswego and the Chenango (connecting it with Baltimore and the Chesapeake), while northward from Albany runs the Champlain canal, communicating with the St. Lawrence by means of that lake.

The Mississippi is the next great system of inland navigation, the upper portion dealing with the navigation between St. Paul's (Minnesota) and St. Louis (Illinois). The rapids of Keokuk on this section are avoided by a canal. Between St. Louis and New Orleans, a distance of 1,250 miles, steamers and barges of considerable size ply, but large ocean vessels cannot get up further than Vicksburg, or under the most favourable circumstances to Memphis, and indeed seldom go beyond New Orleans. Of late years the size of ocean steamers has so greatly increased, that even this port, which has always had many difficulties to contend against in the filling up

the mouth of the Mississippi, has to a great extent suffered from the inability of the vessels to approach the port ; but large works have recently been undertaken to deepen the entrance, so that New Orleans will resume all her former activity, and will become not only the leading cotton, but the grain port of the States.

The Missouri river, which joins the Mississippi at St. Louis, is navigable as far as Fort Benton in Montana Territory for small steamers, but the construction of the Central Pacific railway has caused the water traffic to fall greatly off.

The Ohio river navigation is one of the most important in the States, as it is the route by which the coal is taken from the Pennsylvanian and Virginian basins as far as New Orleans. The shipments of coal from Pittsburg by river amounted to $2\frac{1}{2}$ million tons in 1876, and after a rise in the water (the Ohio being liable to considerable fluctuations of depth), 46 fleets, comprising 369 barges and carrying 4 million bushels of coal, have left Pittsburg within the space of three days. The importance of the Ohio river as a commercial highway may be understood, when it is considered that many places in the Western and South-Western States are dependent upon it for their produce, and that, bordering upon the upper stream of the Ohio, there are coalfields embracing a territory of 122,000 square miles. Near Louisville (Kentucky) there are falls which are evaded by the Louisville and Portland Canal.

The States of Tennessee and Alabama are both served by the navigation of the Cumberland and

Tennessee rivers, which fall into the Ohio, the former being navigable to Nashville, and the latter to Decatur and Chattanooga. Shoals and low water, however, tend to partially destroy the value of the river system. The Wisconsin and Fox River navigation is an important waterway connecting the Mississippi with Lakes Michigan and Superior, and thus accommodating the States of Iowa and Minnesota. Other canals and river improvements are projected, and some of them are being carried out ; but up to the present time the foregoing may be considered as the chief routes.

As there are over 75,000 miles of railways at present in operation in the United States, it would be impossible, and indeed useless, to name them all. Some of the leading routes on great railway systems should, however, be delineated, as not only does the transport of goods give rise to enormous industries, but very important effects are produced on trade, not only at home, but of other countries, by the construction of fresh lines. The manufacturing districts, such as those of New York and the New England States, are supplied most plentifully with railway communication, the principal companies being the Vermont Central between New London and Montreal (Canada), the Grand Trunk, a line which belongs more to Canada than to America, between Portland (Maine), Richmond and Montreal, from whence it runs on the north side of the St. Lawrence and the Lakes to Port Sarnia at the foot of Lake Huron. At this point, however, it is connected with a line to Chicago, called the Great Eastern, so that the Grand Trunk system is of importance as being the main

freight line and the carrier of provisions from Chicago to Liverpool. American intercommunication with Canada is also served by the Canada Southern Railway, which, beginning at Buffalo, crosses the Niagara River, runs along the north side of Lake Erie, and recrosses into the States at Detroit and Toledo.

The New York Central is a competitor of the Grand Trunk for the traffic of the North, and runs between New York and Albany, where it sends its connections east to Boston by the Hoosac Tunnel line, and north-west to Syracuse and Buffalo. The Erie line, with its innumerable ramifications, gathers up the traffic from Chicago and the Western States and brings it to New York. It must be borne in mind that the railway system in America has become very complex, and that a vast number of railways, originally independent, have become absorbed in the operations of one great company. Under these circumstances we find a system like the Erie, running, with its immediate connections, in all directions of the compass and conveying to the Atlantic seaboard, goods from such opposite quarters as Milwaukee, on Lake Michigan, and St. Louis on the Mississippi.

The Pennsylvania Company is another example of these overgrown railway corporations, for the lines controlled by it constitute the most extensive railway organization in the world. The number of miles under its direction is over 6,000, nearly 8 per cent. of the entire American system, while its capital consists of $8\frac{1}{2}$ per cent. of the whole. Its railways, the main objects of which are of course to serve the iron and coal regions of Pennsylvania, pass through or extend into ten other

States, and have direct command of the connections between the Atlantic, the Lakes, and the Mississippi, the value of the commerce of this one company being equal to the entire foreign commerce of the States. As it has termini at New York, Philadelphia, Baltimore, and Washington, it has the lion's share of the traffic between the Western cities and these ports.

The Philadelphia and Reading Railway is perhaps the busiest coal-carrying line in the States, ramifying through all the districts and valleys of the Schuylkill coal region. This company indeed owns and works a large proportion of the collieries on its lines, and thus secures for itself a monopoly not only of produce, but also of carrying that produce to market.

The Gulf and South-Western States are, on the whole, well off for railway communication with the Atlantic States, though the country being sparsely inhabited and manufactures few, the network of local lines that characterize the North is absent. The two principal trunk lines are the Great Southern mail route between Washington and Memphis on the Mississippi, and the Mobile and Ohio line, connecting the port of Mobile on the Gulf of Mexico with that of Chicago on Lake Michigan. Chicago is also united with the South by another trunk line through Cairo and Jackson to New Orleans.

It is, however, when we get west of the Mississippi that we find the triumph of the railway system, by the carrying of the iron road for thousands of miles across the trackless desert and over gigantic chains of mountains until the Pacific slope is reached, with its busy mining cities and fertile valleys. By means of the

three continuous systems known as the Chicago, Rock Island, and Pacific, the Union Pacific, and the Central Pacific Railways, which run from Chicago to Omaha, Cheyenne, Salt Lake and San Francisco, there is a route without break across the whole continent from New York to the coast of California, a distance of 3320 miles. Other lines are carried from St. Louis through Kansas into Colorado, and south-west to San Antonio in Texas, near the borders of Mexico. There is nothing in the Old World to compare with these colossal railway systems, by which journeys are counted by days and not by hours, and on which the scenery, whether of prairie, mountain ridge, cañon, or cultivated valley, is on nature's largest and most splendid scale. The Americans view railway making from a different standpoint to that of the English. Our British lines have grown up as each town required the accommodation; but in the United States the railway is very often the first sign of civilization that appears, leaving the population to come after it, which it invariably does.

The proportion of railway mileage in the various groups of States in 1874 was as follows:—The New England States, viz., Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, 5,509; Middle States, viz., New York, New Jersey, Pennsylvania, Delaware, Maryland, Columbia, West Virginia, 14,291; Southern States, viz., Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, and Arkansas, 15,602; Western States, viz., Ohio, Michigan, Indiana, Illinois, Wisconsin,

Minnesota, Iowa, Kansas, Nebraska, Missouri, Wyoming, Utah, Dakota, and Colorado, 34,882 miles; Pacific States, viz., California, Oregon, Nevada, and Washington, 2,339 miles. Considering that in the year 1830 there were in America just 23 miles of railway in operation, it must be admitted that this rapidity of increase is one of the most remarkable features of the country.

SEAPORTS AND BUSINESS CITIES.

COMMENCING with the northern coastline of the Atlantic seaboard, we find that the State of Maine possesses but two ports of any consequence. The principal of these is *Portland*, the largest city on the coast east of Boston, and the terminus of the Grand Trunk Railway, in correspondence with which ocean steamers run to Liverpool and Glasgow. Its chief exports are flour and grain, shipped in great quantities, cattle, and petroleum, while ship-building is extensively carried on. Portland is also the head-quarters of the cod and mackerel fishing, in which Maine is exceeded only by Massachusetts. *Bangor* is a port with a considerable lumber trade, some little way up the Penobscot River. *Portsmouth*, the only port of New Hampshire, has the advantage of a deep harbour never impeded by ice, at the mouth of the Piscataqua River. It has a trade in lumber and fisheries. Massachusetts, as being the busiest manufacturing State,

possesses in *Boston* a port second only to New York as regards its foreign commerce ; for, her harbour being rarely frozen over in winter, and having a very deep water front, she can load any number of vessels without delay. Boston is the business city of Massachusetts, the manufactures of which, in the shape of textiles, leather and leather goods, comprise nearly one-half the total value of all goods made in the State. The textiles represent over 92 million dollars, and about 28 millions are invested in the boot and shoe trade ; and of the latter articles there were despatched from Boston in 1878 nearly 1,650,000 cases. The other chief shipments consist of cotton, wool, provisions, grain, and live cattle, and a great trade is carried on in connection with the fisheries. Boston has wonderfully increased in size. A hundred years ago its population was a little over 15,000, but now, with the adjacent towns of Charlestown, Roxbury, Dorchester, and Brighton, which have been absorbed into it, the city contains nearly 400,000 people. The other ports of Massachusetts are *Gloucester*, from whence hail the cod and mackerel fishing vessels, and *New Bedford*, the head-quarters of the whale fishery.

Rhode Island has three ports on its short coast-line, viz., *Providence*, its capital, a busy manufacturing town at the head of Narraganset Bay, with a large coasting trade ; *Newport*, remarkable for its splendid harbour ; and *Bristol*, where some fishing is carried on. In the State of Connecticut are *New Haven*, with a coasting trade, but principally given up to manufactures, and *New London*, interested in the whale fishery.

New York, the metropolis of the United States, occupies the whole of the island of Manhattan, but it has so immensely increased in size of late years that it may be said practically to include the neighbouring cities of Brooklyn and Jersey City (in New Jersey), which are connected with it by steam ferries. The population of New York proper in 1880 was 1,206,590 (in 1800 it was only 60,489); but to that will have to be added the population of Brooklyn, 566,689, and sundry suburbs, which will bring it to nearly two millions. New York, like London, does business with all the world. It has docks with 25 miles of available water-front, while Brooklyn has a water and warehouse frontage of $8\frac{1}{2}$ miles in extent. In 1878 over 7,000 steamships, vessels of different nationalities, entered the port, and the value of the import trade in the same year was \$303,186,867, and of the exports, \$362,522,088. These great sums only concern the foreign trade, without taking into consideration the vast home trade and the gigantic manufacturing concerns of which New York is the centre. The bulk of the exports to Great Britain consist of cotton, grain, and petroleum, though there is also an enormous trade in bullion (gold and silver), copper, tobacco, and dairy produce, in which perhaps New York State exceeds that of any other. As the point from whence radiate numerous lines of steamers to all parts of the world, New York is the great emigrant port, the numbers (of all nationalities) who arrived there in 1878 being over 75,000, who were distributed to their various destinations westward. The communication between England and New York is con-

tinuous and rapid, and not a day passes without the arrival and departure of some of the great ocean steamers, such as the Cunard, Inman, or White Star Line to Liverpool, or the North German Lloyd to Southampton.

New Jersey State, although it has a considerable coast-line, has but few ports, its chief being *Jersey City*, which is united to New York by steam ferries, and, indeed, is practically identical in commercial and customs affairs. The Cunard steamers have their head-quarters here. Pennsylvania has no sea-board whatever; but the noble streams of the Delaware and the Schuylkill have placed the city of *Philadelphia*, which is 96 miles from the open sea, in the position of the third port of the States, ranking after New York and Boston. There are few, if any, cities in America which can show so continuous and rapid an increase in their business, or which present an appearance of such comfort and dignity as Philadelphia. Its chief exports are wheat, cotton and petroleum, and for the shipping of the former article, enormous elevators have been built at the junction of the two rivers. Besides these, there is a considerable live cattle export trade, together with fresh meat, refined sugar, agricultural implements, sewing machines, hardwares, etc. The exports in 1878 amounted to \$48,379,031, and the imports to \$21,048,197. As in most other American ports, the exports far outweigh the imports, especially since about the year 1873, showing how the country is more and more developing sufficient resources to supply her own wants, thus becoming less dependent on other countries, besides

having a large surplus to dispose of in foreign trade. Philadelphia is not only a great sea-port, but it is one of the chief manufacturing centres of the United States, the value of its industrial productions in 1878 being estimated at \$115,000,000; the leading manufactures are iron and steel, engines and locomotives, clothing, carpets and woollen goods.

Delaware State, though it has a considerable coastline bordering Delaware Bay, has but one port, that of *Wilmington* (where some ship-building is carried on), owing to the fact that the shore consists of long sandy beaches, affording no good harbours or offings. A little to the south-east of Wilmington, although a long way round, if we follow the projections and sinuosities of the Chesapeake Bay, is the busy port of *Baltimore*, the fourth in value in the States. The principal exports are grain (the shipments of which have very greatly increased with the last few years), cotton, tobacco, (Baltimore being the outlet for the Maryland and Ohio tobacco crops), provisions, and particularly lard and bacon. Most of the bacon goes to England, and the lard to Germany. This port is the terminus of the Baltimore and Ohio railway system, by means of which a large trade is brought to it from the Western States. A regular communication is kept up with Liverpool by the Allan steamship line.

Virginia has two ports, viz. *Richmond*, situated some distance up the James River, and possessing a considerable trade in tobacco; and *Norfolk* on the south side of Chesapeake Bay, which has a harbour open at all seasons of the year. A large fruit shipping trade is carried on here, and there is a government naval

yard at Gosport, very near it. In North Carolina are the ports of *Newbern*, on the Nense, 40 miles above its entry into Pamlico Sound, with a local trade of cotton and lumber shipping; and *Wilmington*, 34 miles from the sea on Cape Fear River. This port was very noted during the Civil War in 1863-4, for the numbers of blockade runners that successfully evaded the enemy, nearly 400 vessels having entered in the twelve months. In South Carolina is the port of *Charlestown*, built upon a peninsula between the Rivers Ashley and Cooper, and defended by four forts. It has a considerable shipping trade in cotton, naval stores and phosphates (for artificial manure). *Beaufort* and *Georgetown* are smaller places with a similar trade. *Savannah*, the only port of Georgia, and indeed between Charlestown and the extreme point of Florida peninsula, is a very rising town, owing to the development of the southern railways and the rapid communication with cities like St. Louis, in consequence of which it is drawing away some of the trade of New Orleans. A great quantity of the celebrated Sea Island cotton is shipped at Savannah, together with some grain, rosin and turpentine, while its position with regard to the West Indian Islands is gaining for it an import trade in tropical fruits, which find a ready market in the Atlantic States.

With the exception of *Jacksonville*, some 25 miles up the St. John's River, which has a considerable lumber trade, Florida possesses no ports on the Atlantic side; but on the Gulf of Mexico are the spacious harbours of *Appalachicola*, *Fernandina*, and *Pensacola*, the two latter towns founded by the

Spaniards in the 17th century. A little further east is the very important city of *Mobile* (Alabama), situated some 30 miles from the Gulf, and the outlet of 2,000 miles of river navigation. Mobile is, next to New Orleans, the largest cotton shipping port in the States, while its greatest import is that of coffee from Brazil. In the season of 1877-8, the shipments of cotton (exclusive of the home trade) were nearly 84 million lbs., of which 52 million went to Great Britain. Mobile is also the centre of a large lumber trade, but it is somewhat crippled by the want of a good ship channel from the harbour to the Gulf.

New Orleans (Louisiana) ranks sixth in American ports for the value of its imports, but in its exports of domestic produce, such as cotton, tobacco, sugar and rice, it exceeds those of Philadelphia, Boston and Baltimore combined. Considering that New Orleans is the natural gateway of 17,000 miles of the navigable waters of the Mississippi and its tributaries, it ought to be, and probably will be yet, the richest and busiest port in the States ; but its progress has been much retarded by two causes : (1), the visitations of yellow fever, which are not to be wondered at, considering that New Orleans is one of the most neglected and filthiest cities in the world from a sanitary point of view ; (2), that it is situated 100 miles from the entry of the Mississippi into the Gulf, at which there are very awkward bars, hindering the approach to the port of ocean steamers. This, however, has been to a great extent remedied by the erection of long jetties at the mouth, by which the passage has been deepened. The railway system has rather militated against New

Orleans, as great efforts are being made by the companies connected with St. Louis to send traffic over their lines to the Atlantic ports, such as Savannah, Norfolk, etc., and thus divert it from New Orleans. *Galveston*, and the small port of *Indianola*, are the two shipping outlets of Texas. The former is situated on an island at the mouth of Galveston Bay, and has a considerable trade with England in cotton, Texas cattle and hides, the export of the latter exceeding that of any other United States port.

We must now overleap a vast expanse of continent, until we arrive at the Pacific coast, the nature and contour of which are not favourable for great shipping trades. There are, indeed, along the whole coast-line, but two ports of any note. The first of these, commencing from the north, is *Portland*, in the State of Oregon, situated on the Willamette River, near its junction with the Columbia River. *Astoria* is the real port, as far as position near the sea goes, but vessels of a large tonnage can reach Portland, which is the shipping port of the wool, mining produce, grain, and canned salmon, for which Oregon is famous. At *Coos Bay*, near the southern boundary, coal is mined and shipped. The harbour of the west, however, is *San Francisco*, which is, both from capability and beauty of situation, worthy of California, one of the richest, most fertile, and most varied countries of the world. The wealth that passes through the port of San Francisco is prodigious. The main items of this trade are precious metals, such as gold and silver, with quicksilver, a vast proportion of which goes inland to the eastern cities of the States, though a very

large quantity is shipped to Great Britain, China, Japan, and Europe generally; wool, of which 52 million lbs., the produce of California, Washington, and Oregon, have been shipped in a single year; while the exportations of wheat, oats and flour, grown in the Pacific and Rocky Mountain States, are almost incredible. Nothing illustrates the singular mutations of industry more pointedly than this fact, that Great Britain, France, and other countries of the Continent are every year becoming more and more dependent for their bread-stuffs upon the shipments of San Francisco, a place which has grown up within the memory of the present generation. This port is the chief place of import for China and Japan teas and West Indian sugars, and rapid lines of steamers have been established to Australia and China, so that by means of the Pacific Union Railway system, the quickest route, as well as the most beautiful, to Australia from England is *viâ* New York and San Francisco. Nor should it be forgotten that the continuous arrivals of Chinese by the same routes are fast peopling the Pacific and Western States with the Mongol race, and that the Chinese element is in many cases displacing the Anglo-Saxon on his own ground.

We have seen in the foregoing pages what are the resources of the great American Continent, and to how great an extent they have been developed by the ceaseless activity of an energetic and ingenious people. As regards manufactured goods, it is impossible to allude to them except in the briefest manner, seeing that every town, almost every village, is a centre, more or less, of manufacturing industry. The

six New England States, which are almost exclusively devoted to manufactures, have a population of 3,362,000 dependent on their industries. Massachusetts, next to textiles, is particularly celebrated for its clothing industry, and more especially boots and shoes, which, in places like Lynn, Worcester, Newburyport, etc., are turned out by the million in factories and by machinery. The same principle is applied to watches, which are produced at Waltham in incredible numbers and sent to all parts of the world. Connecticut has a specialty for hardwares and tools, nor must we omit the sewing machine, of which the United States may be considered the home. Watch and clock making are also actively carried on in Waterbury and other places.

Vermont is known for its numerous tanneries, and for the manufacture on a large scale of carriages, and also of weights and measures.

Amongst other American specialities should be mentioned the manufacture of saws and axes. The lumber trade being, as we have seen, of such vast importance, it is a matter of course that the fitting up of saw mills becomes also a large industry, and we find, therefore, extensive mill-factories for saws at New York, Boston, St. Louis, Bangor, Newark, etc., as also for American axes, which have a world-wide reputation. Philadelphia, New York, Rochester, Troy and Chester are the head-quarters of this branch. Buffalo and Chicago produce more agricultural machinery than any other cities, but, as a matter of fact, there are very few towns which do not contain some adjunct to this necessary trade, and even in the far North-west

find small places, in which the population has probably been only of a couple of years date, possessing establishments for turning out doors, sashes, spokes, hubs, wheels, and everything that is requisite for settlers in a country where wood is unlimited in supply.

SYNOPTICAL TABLE OF INDUSTRIES.

[Only the chief industrial places are mentioned. The figures denote the population of towns and cities over 10,000 according to the last census of 1880.]

ALABAMA (1,262,794)—Agriculture, maize and wheat ; coal, iron, ore, lead, gold and manganese ; marble ; cotton, cane, sugar, rice, tobacco and wine ; timber ; textiles.

Anderson—Coal mining.

Birmingham—Iron ore mining ; ironworks.

Cedar Bluffs—Ironworks.

Chambers—Cotton mills.

Clayton—Cotton mills.

Cullman—Car building ; saw mills ; furniture making ; cigar trade ; tanning ; fruit canning.

Decatur—Coal mining.

Lauderdale—Cotton mills.

Mobile (31,205)—Cotton shipping port ; cotton mills ; oyster fisheries ; iron foundries ; machine shops ; lumber trade.

Montgomery (16,714)—Cotton mills ; tobacco trade ; foundries.

Newtown—Cotton mills.

Stonewall—Iron works.

Tuscaloosa—Cotton mills; foundries; agricultural machinery.

Woodstock—Iron works.

ARIZONA (40,441)—Agriculture; wheat and barley; coal, iron ore, gold, silver, copper, salt and gypsum.

Castle Dome—Lead mining.

Mohave—Gold and silver mining.

Tucson—Gold and silver mining; quartz crushing.

Pinil—Gold and silver mining.

Yuma—Quartz mills.

ARKANSAS (802,564)—Agriculture, maize, wheat and oats; wool; coal, iron ore, zinc and lead; cotton, rice, tobacco, molasses, wine and salt; timber.

Camden—River trade.

Helena—River and general trade.

Hotsprings—Whetstone quarries.

Little Rock (13,185)—Flour mills; foundries; door and sash works.

Ouachita—Flour and saw mills.

Pine Bluffs—Cotton and general trade.

Washington—Saw mills; wool-carding.

CALIFORNIA (864,866)—Agriculture, wheat, barley and fruit; wool; coal, gold, silver, copper, lead, iron ore, quicksilver and petroleum; flax and silk; tobacco, wine and olives.

Butte—Gold mining; quartz crushing.

Los Angeles (11,311)—Tobacco growing; grist mills.

Marysville—Woollen factories ; flour, saw and quartz mills.

New Almaden—Quicksilver mines.

Pico—Petroleum wells.

Sacramento (21,420)—River and mining trade.

San Fernando—Petroleum wells.

San Francisco (233,956)—Shipping port for bullion and grain ; woollen mills ; copper rolling ; machine shops.

Santa Clara—Woollen and paper mills.

Yuba—Gold mining.

COLORADO (194,649)—Agriculture, wheat and maize ; gold, silver, lead, iron ore and coal ; lumber.

Arapahoe—Quartz mills ; pottery ; paper mills ; machine shops.

Denver (35,630)—Iron works ; woollen and flour mills ; car and waggon building.

El Moro—Coke making.

Fremont—Woollen mills ; tanneries.

Leadville (14,820)—Silver and lead mining.

COLUMBIA DISTRICT (177,638).

Georgetown (12,578)—Shipping port.

Washington (147,307)—United States capital and seat of Government ; printing and publishing.

CONNECTICUT (632,683)—Agriculture and dairy farming ; iron ore, copper and lead ; textiles.

Bridgeport (29,148)—Iron works ; sewing machines ; carriage building.

Bristol—Copper mining.

Canaan—Iron-ore mining.

Chatham—Cobalt mining.

Cornwall—Iron-ore mining.

- Glastonbury*—Antimony mining.
- Hartford* (42,555)—Silk factories; tobacco trade; silver plating; pistols; screws; tools; sewing machines.
- Housatonic Valley*—Limestone quarrying.
- Meriden* (13,540)—Flint glass works; silver plating.
- Middleton* (11,731)—River and coasting port; lead mining.
- Milford*—Marble quarrying.
- New Britain* (13,978)—Hardware; hosiery mills.
- New Britain* (62,882)—Shipping port; car building; ammunition making; tool shops.
- Norwalk* (13,956)—Engine factories.
- Plainville*—Nut and bolt making.
- Rockville*—Cotton mills.
- Salisbury*—Iron mining and iron works.
- South Manchester*—Silk factories.
- Stamford* (11,298)—Lock making.
- Sandbury*—Copper mining.
- Thomaston*—Cutlery.
- Union City*—Iron works.
- Wallingford*—Cutlery and hardware.
- Washington*—Marble quarries.
- Waterbury* (20,269)—Watch making; brass ware; buttons; tools.
- DAKOTA (135,180)—Agriculture; wheat and maize; iron, gold and silver.
- Custer City*—Gold mining.
- Deakwood*—Gold mining.
- Fargo*—Engine shops; lumber mills.
- Yankton*—Grain market; flour and saw mills.

SYNOPTICAL TABLE OF INDUSTRIES. 197

DELAWARE (146,654)—Agriculture, maize, wheat and fruit textiles.

Dover—Fruit canning.

Newcastle—Woollen factories.

Rockford—Woollen mills.

Wilmington (42,499)—Cotton and woollen factories; iron mills; ship-building; acid works; saw, flour, and paper mills.

FLORIDA (267,351)—Agriculture, maize and oats; cotton, jute and hemp; tobacco, sugar and indigo; fisheries; lumber.

Appalachicola—Shipping port and coasting trade.

Fernandina—Lumber shipping.

Jacksonville—Lumber shipping; fisheries.

Key West—United States naval yard.

Ocala—Sugar mills; cotton growing.

Pensacola—Cotton and lumber shipping.

St. John's—Shad fishing.

GEORGIA (1,539,048)—Agriculture, maize and wheat; iron-ore and gold; cotton and jute; tobacco and rice; textiles; lumber.

Albany—Woollen factories.

Athens—Cotton and woollen mills.

Atlanta (37,421)—Woollen mills; planing and rolling mills; machine shops; boot and shoe trade.

Augusta (23,023)—Iron foundries.

Bartow—Iron works.

Brunswick—Rice mills; foundries.

Cedartown—Iron works.

Chattooga—Cotton factories.

Columbus—Cotton and woollen mills.

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Geneva—Jute spinning; cheese making; flour mills; machine shops.

Henry—Agricultural implements; flour mills.

Jerseyville—Car works; agricultural machinery; flour mills.

Joliet (16,145)—Iron works.

La Salle—Glass works; zinc smelting.

Monroe—Car works; roperies; breweries.

North Chicago—Iron works.

Peoria (29,315)—Grist and saw mills.

Rock Island (11,660)—Government arsenal; distillery; pottery; paper, saw and iron mills; woollen factories; agricultural machinery.

Rockford (13,136)—Paper mills; glove making; boot and shoe trade.

St. Charles—Cheese making; paper mills.

Sycamore—Flax mills; agricultural machinery.

Woodstock—Pickle making.

INDIANA (1,978,362)—Agriculture, maize, wheat, vegetables and fruit; coal, iron and petroleum; wool; lumber; textiles.

Delphi—Saw and paper mills.

Elkhart—Woollen factories.

Fort Wayne (26,880)—Machine shops; iron foundries.

Indianapolis (75,074)—Brass and iron foundries.

Jeffersonville (10,422)—Glass works.

Monticello—Woollen factories; saw mills.

New Albany (16,422)—Iron and nail mills; plate glass works; woollen factories; edge tool and machine works.

- Perry*—Coal mining ; cotton and woollen factories ; furniture and woodware.
- Putnam*—Nail, chain and pump making ; planing mills ; woollen factories.
- Richmond* (12,473)—Nail making ; paper, saw and flour mills.
- Rushville*—Planing mills ; waggon works ; woollen factories.
- South Bend* (13,279)—Sewing machines ; tanning ; agricultural implements ; paper, flour and saw mills.
- Tell City*—Cotton and woollen factories ; coal mining ; quarrying.
- Terre Haute* (26,040)—Iron works ; woollen and cotton factories.
- Vincennes*—Fur and skin trade.
- Wabash*—Iron foundries ; woodware ; carriage works ; woollen mills.
- IOWA** (1,624,620)—Agriculture, wheat, maize and barley ; coal, iron ore and lead ; wool ; lumber ; textiles.
- Exeter*—Coal mining ; potter's clay.
- Farington* (19,450)—River trade ; pork packing ; iron foundries.
- Clear Rapids* (10,104)—Pork packing ; woollen factories ; agricultural implements ; car building ; oil mills.
- Clear Lake*—Lumber trade ; agricultural machinery.
- Clear Lake* (18,059)—Machine and tool shops.
- Clear Lake* (21,834)—Grain trade ; woollen mills ; hat and shoe trade.

SYNOPTICAL TABLE OF INDUSTRIES. 201

- Des Moines* (22,408)—Woollen and paper mills ; pottery ; agricultural implements.
- Dubuque* (22,254)—Lead mining ; river port ; iron, woollen and paper mills ; leather trade.
- Konesville*—Woollen mills ; foundries.
- Keokuk* (12,107)—River port ; woollen factories.
- Maquoketa*—Woollen mills ; tanning.
- Moingona*—Coal mining.
- Nevada*—Coal mining ; flour mills.
- Ontario*—Coal mining.
- Renta*—Glass works.
- Sioux City*—Pipestone quarries.
- Washington*—Flour mills.
- KANSAS (995,966)—Agriculture, maize and wheat ; coal and iron ore ; tobacco and salt ; textiles.
- Atchison* (15,106)—Woollen factories ; flour mills.
- Cherokee*—Zinc smelting.
- Kansas City*—Stock transport ; pork packing ; iron mills.
- Lawrence*—Woollen factories.
- Leavenworth* (16,550)—Iron foundries and machine shops ; woollen, saw, and flour mills.
- New Pittsburg*—Zinc smelting.
- Rosedale*—Iron mills.
- Topeka* (15,451)—Iron mills.
- KENTUCKY (1,648,708) — Agriculture and maize ; coal, iron, lead and petroleum ; tobacco and salt ; lumber ; textiles.
- Ashland*—Iron and nail works.
- Covington* (29,720) — Wire works ; cotton factories.
- Flemingsburg*—Steam saw mills.

Frankfort—Lumber trade.

Greenup—Iron works : flour mills.

Hanging Rock—Iron mining and works.

Louisville (123,645)—Iron works ; tobacco, whisky and pork packing trades.

Newport (24,433)—River trade.

Paducah—Rolling mills ; tobacco and cigar trade ; car and waggon building ; iron trade.

Red River—Iron works.

Uniontown—Coal mining ; distilling ; flour and saw mills.

Warren — Brickyards ; iron foundries ; woollen mills.

Wurtland—Coal mining.

LOUISIANA (940,103)—Agriculture and maize ; sugar and rice ; cotton and jute.

Baton Rouge—Rice mills ; machine shops and iron foundries.

New Orleans (216,140) — Cotton and grain shipping ; cotton factories ; iron foundries ; chemical works ; boot and shoe trade.

MAINE (648,945)—Agriculture, maize, vegetables and fruit ; copper ; lumber ; horse-breeding, and fisheries ; quarries ; textiles.

Aroostook—Starch factories.

Auburn—Cotton factories ; boot and shoe trade.

Bangor (16,857)—Shipping and lumber port ; saw works.

Belfast—Boot and shoe trade.

Biddeford (12,652)—Cotton manufactories.

Katahdin—Iron works.

Kittery—United States naval yard.

- Lewiston* (19,083)—Cotton and woollen factories ; boot and shoe trade.
- Norway*—Boot and shoe trade.
- Portland* (33,810) — Shipping port for grain and cattle ; machine works and foundries.
- Presumpscot*—Iron mills.
- Saco*—Cotton mills.
- West Waterbury*—Scythe works.
- MARYLAND** (934,632)—Agriculture, maize and sweet potatoes ; coal, iron and copper ; tobacco ; textiles.
- Baltimore* (332,190)—Shipping port for cotton and grain ; cotton, woollen and silk mills ; copper smelting ; machine shops ; tanneries.
- Catoctin*—Iron works.
- Cecil Co.*—Rolling and planing mills ; paper making ; cotton factories.
- Centreville*—Car building ; woollen factory ; grist and saw mills.
- Cumberland*—Collieries ; cement works ; rolling mills ; machine shops ; boat building.
- Frostburg*—Iron works.
- Howard*—Cotton mills ; curled hair factories.
- Laurel*—Cotton mills.
- MASSACHUSETTS** (1,783,012) — Market gardening ; coal and iron ; fisheries ; quarries ; textiles.
- Abingdon*—Nail and tack making.
- Attleborough* (11,111)—Jewellery making.
- Beverley*—Boot and shoe trade.
- Boston* (362,535)—Shipping port for cotton ; cotton and woollen factories ; boot and shoe trade ; leather trade ; iron foundries ; organ building ; clothing factories ; saw works.

- Cambridge* (52,740)—Brick making ; wood ware.
Cumberland—Coal mining.
Fairhaven—Nail and tack making.
Fall River (49,006)—Cotton and woollen mills ;
bleaching.
Fitchburg (12,405)—Machine and tool shops.
Gloucester (19,329)—Cod and mackerel fishing ; net
making.
Haverhill (18,475)—Boot and shoe trade.
Holyoke (21,851)—Paper making ; cotton and wool-
len factories.
Lawrence (39,178) — Cotton, woollen and worsted
mills.
Lenox—Plate glass works.
Lowell (59,485)—Cotton and woollen factories ;
carpet works.
Lynn (38,284)—Boot and shoe trade.
Marblehead—Shipping port ; boot and shoe trade.
Marlborough (10,126)—Boot and shoe trade.
Milbury—Cotton and hosiery factories.
Monson—Granite quarrying.
New Bedford (26,875)—Whale fishing.
Newburyport (13,537)—Ship building ; cotton mills ;
boot and shoe trade.
Northampton (12,172)—Silk mills.
Pelham—Granite quarrying.
Pocasset—Iron works.
Quincy (10,529)—Granite quarrying.
Salem (27,598)—Leather trade.
Springfield (33,340)—United States armoury ; iron
mills ; paper collar making.
Stonehaven—Boot and shoe trade.

Taunton (21,213)—Cotton factories; hardwares; locomotive shops.

Waltham (11,711)—Watch making.

Westfield—Whip making.

Weymouth (10,571)—Boot and shoe trade.

Woburn (10,938)—Leather trade.

Worcester (58,295)—Machine shops; wire mills; cotton factories; boot and shoe trade.

MICHIGAN (1,636,331)—Agriculture, wheat, maize, and fruit; coal, iron, silver and copper; wool; lumber and salt.

Adrian—Iron foundries; car building; woollen and flour mills.

Ann Arbor—Woollen, flour and saw mills; brewing; tanning.

Bangor—Iron works.

Bay City (20,693)—Saw mills and lumber trade; salt wells.

Berrien—Flour and lumber trade.

Detroit (116,342)—Iron works; varnish making; agricultural machinery.

East Saginaw (19,016)—Iron foundries; machine shops; paper mills.

Escanawba—Iron ore mining; copper mining.

Flint—Saw and planing mills.

Fruitport—Iron works.

Grand Rapids (32,015)—Lumber trade; flour and saw mills.

Holland—Wood ware; saw mills.

Ishpenning—Iron ore and copper mining.

Jackson (16,105)—Machine and engine shops; potteries; saw and flour mills; waggon works.

Kalamazoo (11,937)—Paper, flour and saw mills.

L'Anse—Copper mining.

Marquette—Iron ore shipping; iron works and mills; machine shops.

Muskegon (11,262)—Lumber trade; saw mills.

Negaunee—Iron ore mining.

Portage Lake—Copper smelting and rolling; candle making.

Saginaw City (10,525)—Saw and lumber mills; salt making.

St. Clair—Saw mills; car works.

St. Joseph—Woollen and paper factories; flour and saw mills.

Shrawassee—Woollen and flour mills.

Traverse—Lumber and flour trade.

Wyandotte—Iron works; river ship building.

MINNESOTA (780,886)—Agriculture, wheat and oats; iron and copper; lumber.

Duluth—Lumber and grain shipping; iron mills.

East St. Cloud—Granite quarries.

Mankato—Woollen mills; iron foundries; breweries.

Minneapolis (46,887)—Flour and saw mills.

Owatonna—Stoneware pottery; flour mills.

St. Anthony—Flour and lumber mills.

St. Croix—Lumber trade.

St. Paul (41,498)—Lumber and flour mills; foundries.

Shakopee—Railway machine shops.

Wabashaw—Saw and planing mills; agricultural implements.

Winona (10,208)—Grain market ; woollen and saw mills ; agricultural machinery ; soap and candle works.

MISSISSIPPI (1,131,592) — Agriculture, maize and sweet potatoes ; cotton and rice ; lumber ; textiles.

Carrollton—Cotton mills.

Columbus—River port for cotton shipping.

Copiah—Cotton and woollen manufactures.

Corinth—Cotton mills.

Grenada—Rolling and planing mills.

Jackson—Lumber trade ; iron foundries.

Natchez—Cotton shipping port.

Vicksburg (11,814)—Cotton shipping and river trade.

Wesson—Cotton and woollen mills.

MISSOURI (2,168,804)—Agriculture, maize and wheat ; wine ; wool and tobacco ; pork packing ; coal, iron, zinc and lead.

Cedar Mountain—Iron ore mining.

Crystal City—Plate glass works.

Hannibal (11,074)—Pork packing ; lumber trade ; iron foundries ; car building ; tobacco trade.

Iron Mountain—Iron mining and furnaces.

Irondale—Iron works.

Jefferson City—Iron foundries ; flour mills ; wood-ware.

Kansas City (55,813)—Hog packing and cattle trade.

Oregon—Iron foundries.

Pilot Knob—Iron ore mining.

St. Joseph (32,484)—Pork packing ; flour and saw mills.

St. Louis (350,522)—Beef packing ; iron foundries ;
woodware ; tobacco mills ; zinc smelting ; saw
works ; whitelead making ; dry goods trade.

Salem—Iron works.

Shibboleth—Lead mining.

MONTANA (39,157)—Agriculture, wheat and vegeta-
bles ; coal, iron, gold, silver and lead ; lumber ;
stock raising.

Deer Lodge—Quartz mills.

Helena—Quartz and flour mills ; distilling ; factories.

NEBRASKA (452,433)—Agriculture, wheat, maize and
fruit ; silver, coal and salt ; stock raising.

Lincoln (13,004)—Salt works.

Nebraska City—Foundries and nail making ; flour
mills.

Omaha (30,518)—Iron works ; machine and loco-
motive shops ; pork packing.

NEVADA (62,265)—Agriculture, barley ; gold, silver,
lead, quicksilver and copper ; salt and soda ;
lumber.

Carson City—Quartz mills ; wheel works.

Esmeralda—Salt beds.

Tybo—Lead mines.

Virginia City (13,705)—Silver mines of the Com-
stock Lode.

NEW HAMPSHIRE (346,984)—Agriculture ; maize ;
gold and iron ; granite ; maple sugar ; textiles.

Concord (13,838)—Cotton factories.

Dover (11,687)—Cotton and woollen mills ; boot
and shoe trade.

Manchester (32,630)—Cotton, worsted and flannel
factories.

Nashua (13,397)—Iron works ; cotton mills.

Pike—Scythe making.

Portsmouth—Shipping port.

Shelburne—Lead mining.

NEW JERSEY (1,130,983)—Agriculture, maize and market gardening ; iron, copper, zinc and china, clay ; textiles.

Bergen Point—Zinc smelting.

Bridgeton—Tool works.

Burlington—Iron foundries.

Camden—(41,658)—Iron foundries ; glass works ; nickel smelting.

Elizabethport (28,229)—Sewing machines ; tool and machine shops.

Franklin—Zinc mining.

Jersey City (120,728)—Cunard steamship docks ; zinc smelting ; woollen and print works.

Little Falls—Cheese factories.

Melville—Glass works.

Newark (136,400)—Cotton manufactures ; lead and zinc smelting ; saw works.

Paterson (50,887)—Silk mills ; locomotive shops.

Perth Amboy—China clay digging ; pottery.

Phillipsburg—Iron works.

Secaucus—Bessemer steel works.

South Amboy—China clay and pottery.

Sparta—Zinc mining.

Stanhope—Iron works.

Stirling Hill—Zinc mining.

Trenton (29,910)—Iron and wire-rope works ; pottery.

Woodbridge—China clay and pottery.

NEW MEXICO (118,430)—Gold, silver and coal.

Mimbres—Silver smelting.

Santa Fe—Gold mining.

NEW YORK (5,083,810)—Agriculture, maize, wheat, market gardening and dairy farming; wool; iron, lead and petroleum; textiles.

Albany (90,903)—Railway shops; agricultural implements.

Auburn (21,924)—Wheel works.

Brooklyn (566,689)—Warehouses and docks; foundries, etc.

Buffalo (155,137)—Shipping port for cattle and grain; iron, steel and wire works; ship building.

Cohoes (19,417)—Cotton and knit hosiery mills; iron works.

Elmira (20,541)—Iron works.

Greenpoint—Ship building.

Haverstraw Bay—Brick making.

Hoosick—Iron works.

James Town—Chain making; organ building.

Lake Champlain—Iron-ore mining.

Middleburgh—Paper making.

Middleton—Saw works.

New York (1,206,590)—Cotton and grain shipping and emigration port; iron works; oil refining; woollen and carpet factories, etc.

Onondaga—Salt works.

Port Henry—Iron ore mining and shipping.

Rochester (89,363)—Cotton factories; saw and axe works; machine shops; flour mills.

Rome (12,045)—Iron works.

Seneca Falls—Pump works.

- Schenectady* (13,675)—Locomotive works.
Syracuse (51,791)—Iron works; breweries; salt works; machine shops.
Tarrytown—Brick making.
Troy (56,747)—Iron and steel works.
Wassaic—Iron works.
Watertown (10,697)—Sewing machines.
Westchester—Marble quarries.
Williamsburg—United States naval yard.
Utica (33,913)—Cheese factories.
- NORTH CAROLINA (1,400,047)—Iron, gold, silver, copper, zinc and lead; cotton, rice, tobacco and sugar; fisheries; lumber and turpentine; textiles.
- Abbeville*—Gold mining.
Catawba—Cotton and woollen mills.
Charlotte—Gold mining.
Concord—Cotton and woollen factories.
Dallas—Cotton mills; distilling.
Elkin—Woollen mills.
Fayetteville—Lumber, tar and turpentine trade.
Franklinsville—Iron ore mining.
Graham—Cotton mills.
Jamestown—Copper mining.
Leakesville—Woollen mills.
Lincolnton—Paper and cotton mills.
Newburn—Shipping port for cotton and naval stores; foundries and machine shops; cotton mills; turpentine works.
Pittsboro'—Cotton and woollen factories.
Plymouth—Fish packing.
Raleigh—Paper mills.

Rockingham—Cotton factories.

Silver Hill—Lead mining.

Wilmington (17,361)—Shipping port for cotton and naval stores; fish packing; turpentine works; cotton, saw and planing mills.

OHIO (3,198,239)—Agriculture, maize, wheat and fruit; coal, iron and petroleum; wool and flax; salt and gypsum.

Ashtabula—River shipping port; wood ware; flour mills.

Athens—Iron works; salt works.

Bellaire—Glass works.

Burgess—Steel and iron works.

Cincinnati (255,708) — River port; iron works; pork packing; hardware and agricultural implements; boot and shoe trade; soap and candle making.

Cleveland (160,142)—Iron works; hammer works; pork packing; petroleum refining.

Columbus (51,665)—Glass works.

Cuyahoga—Iron works.

East Liverpool—Pottery.

Fayette—Woollen mills.

Geauga—Cheese factories.

Geneva—Lock making.

Hamilton (12,122)—Foundries; agricultural implements; paper mills; woollen factories; wood ware.

Hocking—Coal mining; iron works; woollen mills; saw mills.

Ironton—Steel and iron works.

Jackson—Iron works; woollen mills; wood ware.

- La Grange*—Glass works.
Madison—Woollen mills.
Mahoning Valley—Coal mining ; iron works.
Niles—Iron works.
Pomeroy—Coal mining ; rolling mills ; salt works ;
 woollen mills.
Portsmouth (11,314)—Steel and iron works.
Sandusky (15,838)—Wood ware ; wheel making ;
 woollen mills.
Steubenville (12,093)—Glass works.
Toledo (50,143) — Shipping port and general
 trade.
Tuscarawas—Collieries and iron mills.
Washington—Rolling mills, machine shops ; tan-
 ning.
Wooster—Locomotive shops ; agricultural imple-
 ments ; paper mills.
Zanesville (18,120)—Glass works.
 OREGON (174,767)—Agriculture, maize and wheat ;
 coal, gold and silver ; lumber ; fisheries.
Astoria—Shipping port.
Baber—Gold mining.
Coos Bay—Coal mining.
Columbia River — Lumber trade ; salmon fisher-
 ies.
Oregon City—Lumber and flour mills.
Oswego—Iron works.
Portland (17,570)—Salmon tinning ; lumber trade ;
 grain shipping.
 PENNSYLVANIA (4,282,786)—Agriculture, maize and
 wheat ; coal, iron, zinc, copper and petroleum ;
 quarries ; textiles.

Altoona (19,716)—Locomotive and machine shops; foundries.

Allen Town (18,063)—Iron mills and foundries.

Beaver—Wire and rivet making; cutlery; glass works; iron foundries; agricultural implements; woollen mills.

Bethlehem—Iron and steel works; zinc smelting.

Blossburg—Coal mining.

Cambria—Iron and steel works; foundries; paper mills.

Carbondale—Coal mining; machine shops; car building.

Catasawqua—Wheel works.

Chester (14,996)—Copper mining; steel works; axe works. *Ship-building.*

Clearfield—Coal mining; foundries and planing mills.

Connellsville—Coke making.

Cornwall Banks—Iron ore mining; iron works.

Danville—Iron works.

Erie (27,730)—Shipping port; foundries; agricultural implements.

Harrisburg (30,762)—Rolling mills and foundries; machine shops; car building.

Johnstown—Iron mining; iron and steel works.

Juniata—Iron works; tanning; woollen mills.

Indiana—Planing and paper mills.

Lackawanna Valley—Coal mining.

Lancaster (25,709)—Coal and lumber trade; agricultural implements; machine shops.

Lebanon—Iron works; locomotive shops.

Lehigh—Coal mining; iron works and mills; zinc smelting.

- Luzerne*—Machine and boiler shops ; stove foundries ; car building.
- Mauch Chunk*—Coal mining.
- Millertown*—Petroleum wells.
- Northampton*—Slate quarrying ; iron ore mining.
- Oil City*—Petroleum wells.
- Philadelphia* (846,984)—Shipping port for cotton, grain and cattle ; woollen and carpet manufactories ; iron foundries and machine shops ; plate glass works ; locomotive works ; ship building.
- Pithole*—Petroleum wells.
- Pittsburg* (156,381)—Collieries ; iron works and foundries ; glass houses ; lead smelting ; oil refineries ; locomotive and machine shops.
- Reading* (43,280)—Railway coal centre ; iron works ; hardware.
- Scranton* (45,850)—Coal mining ; coal and iron shipping.
- Schuylkill*—Coal mining.
- Tioga*—Coal mining.
- Titusville*—Petroleum wells.
- Union*—Woollen factories ; agricultural implements.
- Wilkesbarre* (23,339)—Coal trade.
- Williamsport* (18,934)—Lumber trade.
- RHODE ISLAND (276,528)—Coal and iron ; fisheries ; textiles.
- Bristol*—Ship building and shipping port.
- Cranston*—Iron ore mining.
- Crompton*—Cotton manufactories and printing.
- Cumberland*—Iron ore mining.
- Newport* (15,693)—Shipping port.
- Portsmouth*—Coal mining.

Providence (104,850)—Shipping port ; cotton and woollen mills ; hardware ; locomotive and machine shops ; jewellery.

Taunton—Copper smelting.

Warwick (12,163)—Cotton factories.

Woonsocket (16,053)—Woollen and cotton mills ; machine shops.

SOUTH CAROLINA (99,622)—Agriculture ; maize, cotton and rice ; gold ; china clay ; turpentine ; textiles.

Beaufort—Cotton mills.

Charlestown (49,999)—Shipping port for cotton, phosphates and naval stores ; rice mills ; turpentine works ; agricultural machinery.

Columbia (10,040)—Iron works ; machine shops ; waggon building.

Fingusville—Cotton mills.

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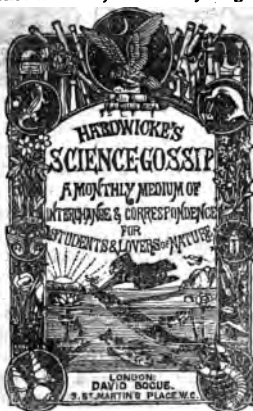
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